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BUSINESS ECONOMICS

PRINCIPLES AND CASES

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PRINCIPLES AND CASES

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AND

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1951

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PREFACE

THIS book combines text and case materials for use in courses which apply economic analysis to the solution of business problems. These courses appear in university catalogues under a variety of names, such as "Business Economics," "Economic Analysis," "Price Policies," "Economics of Enterprise," etc. They are offered both by schools of business administration and by departments of economics. For the most part, they are junior, senior, or first-year graduate courses, and follow the principles course in economics. Commonly, students in these courses have had some training in accounting, finance, and marketing, but a background of these subjects is not necessary to an understanding of the present volume.

The point of view taken by this book is that of the executive responsible for guiding the business enterprise. The authors' purpose is to use techniques of economic analysis to solve—or at least to throw some light on—problems of business management. These problems are of two sorts: those which can be called *internal* because many factors in the situation are within the control of the business company, and those which are *external*, involving conditions which business management cannot control but to which it must adjust. After a preliminary section, Part I, on the nature and function of profits, the authors consider the *internal* economics of the firm in Parts II–V, which discuss the analysis of demand, cost analysis, price policies, and nonprice competition. Parts VI–VIII, devoted to the *external* economics, deal with the adjustment of the firm to business fluctuations, labor conditions, and government regulation.

The problem faced by the authors in writing this book arose chiefly from the fact that the body of economic theory and fact is very large and very complex. A casebook must necessarily be limited both as to the number of business situations covered and as to the variety and technicality of the economic issues treated. Yet, by the nature of the undertaking, it must be handled at the mature level of the business conference. The authors have tried to meet this problem by (1) avoiding or simplifying the technical language of professional economists and (2) by selecting typical situations and economic issues.

This project originated in the need for fresh case materials in the business economics course which was jointly conducted by the authors at Northwestern University. When the work was partially completed, one of the authors accepted an appointment at The Johns Hopkins University. Although the plan of the book and some of the cases had been completed by that time, geographic separation thereafter necessitated more or less independent work on the several parts of the manuscript. As a result, Parts II–V, on internal economics of the firm, are chiefly the work of Mr. Alt; while Part I, on profits, and Parts VI–VIII, on the external economic problems of management, are attributable largely to Mr. Bradford.

An undertaking of this scope necessarily owes much to the work of others. We are grateful to Dean Emeritus Homer B. Vanderblue of Northwestern University, a pioneer in the field of business economics, for his encouragement to write a casebook on this subject, and for permission to quote materials from his articles in the *Harvard Business Review* on pricing policies in the automobile industry. We are also indebted to Dean Arthur R. Tebbutt of Northwestern University for introducing us to the case method and for encouraging us to write this book. The casebook of Professors Malcolm P. McNair and Richard S. Meriam, *Problems in Business Economics*, was used for several years in our courses and served as a useful model for the present work. Part IV, Pricing and Price Policies, owes much to the methods of analysis originated by Dean Edward S. Mason of Harvard University; and we are also indebted to Dean Mason for permission to quote his address to the Chamber of Commerce of the United States of America. No single source has been more helpful than Professor Joel Dean of Columbia University, upon whose original contributions in the field of cost analysis and price policy we have freely drawn. Many other colleagues in academic life have given valuable assistance in reviewing and criticizing cases and text and in permitting us to quote from their published works. We wish to thank the following: Professors Neil H. Borden, John T. Dunlop, and John Lintner and Drs. Frederick W. Gill and Gilbert L. Bates of Harvard University; Professor Arthur R. Burns of Columbia University; Professor Sidney Davidson and Dean Edward R. Hawkins of The Johns Hopkins University; Professor Ralph C. Epstein of the University of Buffalo; Professor Harvey W. Huegy of the University of Illinois;

Professor Albert L. Meyers of Georgetown University; Professor John Perry Miller of Yale University; Professor R. H. Montgomery of the University of Texas; Professor Charles A. Myers of the Massachusetts Institute of Technology; Professor Henry Oliver of the University of Indiana; Professors Carroll R. Daugherty, Dascomb R. Forbush, and H. W. Torgerson of Northwestern University; and Professor Clair Wilcox of Swarthmore College.

Our students have been very helpful, not only as a laboratory group for testing cases but as individual critics. We are also indebted to our students for the contribution of original case materials, particularly to Messrs. William James Fitzgerald, Allen C. Mayer, and Hayes Watkins, our former students at Northwestern University.

Most of the case materials in this book came from business companies, and some were derived from government sources. We wish to acknowledge the generous contribution of time and thought from the following individuals and companies: Messrs. Ralph H. Budd and P. J. Menardi of the Chicago Transit Authority; Wallace A. Cook of Standard Brands; R. E. S. Deichler of American Airlines; William J. Dixon of the Baltimore and Ohio Railroad Company; J. F. Fitzsimmons of the Allis-Chalmers Manufacturing Company, Robert Freedman of the Yellow Cab Company (Baltimore); John S. Gallagher, Jr., and Henry F. McCarthy of the New York, New Haven, and Hartford Railroad; S. L. Horner of the General Motors Corporation; Walter S. Keim, Egil Krogh and Lawrence B. Sizer of Marshall Field and Company; Charles E. Lambert of the Tanis Company; Saul Nelson; D. A. Packard of the Nash-Kelvinator Corporation; Louis J. Paradiso; I. Alvin Pasarew of the Maryland State Planning Commission; James R. Reed; and Albert E. Smyser, Jr., of the Glenn L. Martin Company. We wish also to acknowledge the privilege of inspecting the records of several small business firms whose executives, for their own reasons, wish to remain anonymous.

We wish also to thank the following copyright owners for permission to quote published works: The Brookings Institution; Harper and Brothers; the *Harvard Business Review*; the President and Fellows of Harvard University; Richard D. Irwin, Inc.; the *Journal of Air Law and Commerce*; the *Journal of Marketing*; the McGraw-Hill Book Company, Inc., W. W. Norton and Company; the National Association of Cost Accountants, the National Bureau of Economic Research, Inc.; Prentice-Hall, Inc.; the University of Chicago; and the *Wall Street Journal*.

Progress of this work has been speeded by the generous permission of Dean Donald K. David of the Harvard Graduate School of Business Administration to observe classes and to use the facilities of the school. We are especially obliged to Dr. Donald T. Clark, Associate Librarian of the School, for his help over an extended period. We wish also to thank our loyal assistants, Miss Sue Eager, Mr. Julian Lee Gelwasser, Mrs. Robert Gleckner, and Mrs. Everett Thorpe, for their help in preparing the manuscript.

RICHARD M. ALT
WILLIAM C. BRADFORD

March, 1951

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Part I

PROFIT

IN A FREE-ENTERPRISE society the prospect of profit is the prime motivating force of the businessman. Within the legal and institutional framework of society he attempts to obtain as large a profit as possible from his business operations. It is the prospect of making a profit in the future which causes the businessman to make decisions today concerning the use of the factors of production. The profit motive is not, however, the sole motivating force of all businessmen, since the conduct of any particular firm is greatly influenced by the personalities of those who manage it. Many men are swayed by noneconomic factors, such as prestige, power, social approval, social obligation, independence, and fear of government intervention.[1] Occasionally one hears of a businessman who treats business as a game and plays it just to prove that he is an able player. Where such motives dominate the leader or leaders of a firm, its economic conduct may not always be governed so as to maximize the profits of the firm. In many instances, however, the maximization of profit is a corollary of these noneconomic motives, as in the case of power or prestige. If either is measured by the amount of wealth the individual or a firm possesses, an attempt to make large profits is a means of increasing wealth.

Every newly organized firm hopes to obtain receipts which will more than cover all expenses. Even an existing firm has such hopes when it places a new product on the market or offers an improvement on an old one. Not all such ventures, however, are successful. Exhibit 1 shows the number of business failures, together with the liabilities involved in these failures for the period 1929–47. While this table indicates that the number of failures tends to rise and fall with the swings of the cycle, it also points out that even in periods of prosperity, such as 1929 and 1941, there are business failures. The firms which failed were, of course, not profitable. Exhibit 2 shows the number of business failures by industrial groups and size

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[1] For a detailed discussion of these motives see Clare E. Griffin, *Enterprise in a Free Society* (Chicago: Richard D. Irwin, Inc., 1949), chap. v.

Exhibit 1

INDUSTRIAL AND COMMERCIAL FAILURES: NUMBER AND LIABILITIES, 1929–47

Year or Yearly Average	Total Number of Concerns in Business	Number of Failures	Current Liabilities (Thousands of Dollars)
1929	2,212,779	22,909	$483,252
1930	2,183,008	26,355	668,282
1931	2,125,288	28,285	736,310
1932	2,076,580	31,822	928,313
1933*	1,960,701	19,859	457,520
1934	1,973,900	12,091	333,959
1935	1,982,905	12,244	310,580
1936	2,009,935	9,607	203,173
1937	2,056,508	9,490	183,253
1938	2,101,933	12,836	246,505
1939†	2,116,008	14,768	182,520
1940	2,156,450	13,619	166,684
1941	2,170,615	11,848	136,104
1942	2,151,549	9,405	100,763
1943	2,023,007	3,221	45,339
1944	1,855,033	1,222	31,660
1945	1,909,095	810	30,395
1946	2,141,807	1,130	70,349
1947	2,404,883	3,476	221,048

* Series revised in 1933 to exclude real estate and financial companies. Not comparable with previous years.

† Beginning 1939 new series includes voluntary discontinuances with loss to creditors and small concerns forced out of business with insufficient assets to cover all claims.

Source: *Statistical Abstract of the United States 1948*, Washington, D.C., p. 471.

of liabilities for the year of 1947, a year of prosperity which was due considerably to an enormous backlog of demand for both industrial and consumer goods. Serious shortages existed in many lines in that year. Prolonged inability to supply current demand not only diminishes profits but may also cause losses. While the failures are most frequent in small concerns, it is worthy of note that in the manufacturing group twenty firms with liabilities of more than one million dollars failed in this year. The reasons for the failures are not given. It should also be pointed out that this table does not include failures of new ventures by existing firms who were able to absorb the loss involved because of financial position or profits on other items.

Exhibit 3 shows the profits of all private corporations, after taxes, for the period 1929–48. This table focuses attention upon the in-

Exhibit 2

INDUSTRIAL AND COMMERCIAL FAILURES: NUMBER AND LIABILITIES BY INDUSTRIAL GROUPS AND SIZE OF LIABILITIES, 1947

Industrial Group and Size of Liabilities	Number	Per Cent	Current* Liabilities	Total Liabilities
Total	3,476	100.0	$221,048	$223,620
Under $5,000	600	17.2	$ 1,766	$ 1,766
$5,000 $25,000	1,661	47.8	20,287	20,287
$25,000 $100,000	842	24.2	41,615	41,615
$100,000 $1,000,000	350	10.1	90,041	91,062
$1,000,000 and over	23	0.7	67,339	68,890
Manufacturing	1,275	100.0	142,727	145,254
Under $5,000	86	6.7	244	244
$5,000 $25,000	489	38.4	6,522	6,522
$25,000 $100,000	432	33.9	21,712	21,712
$100,000 $1,000,000	248	19.4	66,220	67,196
$1,000,000 and over	20	1.6	48,029	49,580
Wholesale trade	447	100.0	21,138	21,138
Under $5,000	14	9.8	142	142
$5,000 $25,000	224	50.2	2,935	2,935
$25,000 $100,000	135	30.2	6,767	6,767
$100,000 $1,000,000	44	9.8	11,294	11,294
Retail trade	1,222	100.0	21,459	21,459
Under $5,000	334	27.3	1,005	1,005
$5,000 $25,000	694	56.8	7,770	7,770
$25,000 $100,000	169	13.8	7,655	7,655
$100,000 $1,000,000	25	2.1	5,029	5,029
Construction	239	100.0	7,211	7,211
Under $5,000	64	26.8	169	169
$5,000 $25,000	122	51.0	1,475	1,475
$25,000 $100,000	43	18.0	2,222	2,222
$100,000 $1,000,000	10	4.2	3,345	3,345
Commercial service	293	100.0	28,513	28,558
Under $5,000	72	24.6	206	206
$5,000 $25,000	132	45.1	1,585	1,585
$25,000 $100,000	63	21.5	3,259	3,259
$100,000 $1,000,000	23	7.8	4,153	4,198
$1,000,000 and over	3	1.0	19,310	19,310

* Liabilities in thousands of dollars. Current liabilities include all accounts and notes payable and all obligations, whether in secured form or not, known to be held by banks, officers, affiliated companies, supplying companies, or the government. Deferred liabilities (the difference between current, as defined above, and the total) are therefore long term obligations held by the public.

Source: *Statistical Abstract of the United States 1948* (Washington, D.C.), p. 472.

creasing effect of taxes upon business profits. From the standpoint both of investment on the part of the common stockholder and of retained earnings by the firm for reinvestment in the business, the statement of profits *after taxes* is important. This exhibit shows the increasing proportion of tax payments out of profits. For the period 1941–45 it is interesting to note that profits after taxes show a smaller increase than do profits before taxes except for the years 1944 and

Exhibit 3

PROFITS, BEFORE AND AFTER TAXES, ALL PRIVATE CORPORATIONS, 1929–48

(Billions of Dollars)

Period	Profits before Taxes	Tax Liability*	Profits after Taxes	Dividend Payments	Undistributed Profits
1929	9.8	1.4	8.4	5.8	2.6
1930	3.3	0.8	2.5	5.5	−3.0
1931	−0.8	0.5	−1.3	4.1	−5.4
1932	−3.0	0.4	−3.4	2.6	−6.0
1933	0.2	0.5	−0.4	2.1	−2.4
1934	1.7	0.7	1.0	2.6	−1.6
1935	3.2	1.0	2.3	2.9	−0.6
1936	5.7	1.4	4.3	4.6	−0.3
1937	6.2	1.5	4.7	4.7	†
1938	3.3	1.0	2.3	3.2	0.9
1939	6.5	1.5	5.0	3.8	1.2
1940	9.3	2.9	6.4	4.0	2.4
1941	17.2	7.8	9.4	4.5	4.9
1942	21.1	11.7	9.4	4.3	5.1
1943	24.5	14.2	10.4	4.5	5.9
1944	24.3	13.5	10.8	4.7	6.1
1945	20.4	11.6	8.7	4.7	4.0
1946	21.8	9.0	12.8	5.6	7.2
1947	29.8	11.7	18.1	6.9	11.2
1948‡	34.0	13.2	20.8	7.6	13.2

* Federal and state corporate income and excess profits taxes

† Minus $8 million

‡ Estimates based on incomplete data

Source: U.S. Department of Commerce, *Economic Report of the President to 81st Congress, 1st Session* (Washington, D.C., 1949), p. 127

1945, when there is an absolute decline. In the former year, profits before taxes declined while profits after taxes continued to increase slightly. In the latter year, profits both before and after taxes declined, but the decline in gross was greater than in net. This reflects the payment of the excess profits taxes during the period of the war. The years 1947 and 1948 reflect increased earnings as a result of reconversion to civilian production and also the abolition of the excess profits taxes. Another item of interest is the relative stability of dividend payments from 1936 through 1945. As profits increased, corporations retained larger absolute amounts of profits for working capital and expansion.

Exhibit 4 shows profits for corporations in selected industries. Again the effects of taxation are shown during the period 1941 through 1945. Of particular interest is the shrinkage in profits in

Exhibit 4

PROFITS AFTER TAXES, 629 LARGE PRIVATE INDUSTRIAL CORPORATIONS, BY INDUSTRY GROUPS, 1939–48*

Manufacturing and Mining

(Millions of Dollars)

Period		Total	Iron and Steel	Machinery	Automobiles	Other Transportation Equipment	Nonferrous Metals and Products	Other Durable Goods	Food, Beverages, and Tobacco	Oil Producing and Refining	Industrial Chemicals	Other Nondurables	Miscellaneous Services†
No. of Corporations		629	47	69	15	68	77	75	49	45	30	80	74
1939		1,465	146	115	223	102	119	70	151	98	186	134	122
1940		1,818	278	158	242	173	133	88	148	112	194	160	132
1941		2,163	325	193	274	227	153	113	159	174	207	187	152
1942		1,769	226	159	209	182	138	90	151	152	164	136	161
1943		1,800	204	165	201	180	128	83	162	186	170	149	171
1944		1,896	194	174	222	190	115	88	175	220	187	147	184
1945		1,965	189	164	241	207	109	90	190	224	187	155	202
1946		2,552	282	171	131	229	135	163	357	281	275	302	324
1947		3,671	437	334	417	205	198	239	354	480	345	370	293
1948	1Q	1,023	114	89	120	64	46	64	77	192	91	101	57
	2Q	1,121	130	92	151	69	53	71	86	194	98	100	77
	3Q	1,178	150	93	163	68	59	78	91	186	103	107	80

* Profits after federal and state income and excess profits taxes.

† Includes 29 companies engaged in wholesale and retail trade (largely department stores); 13 in the amusement industry; 21 in shipping and transportation other than railroads (largely air lines); and 11 companies furnishing scattered types of service.

Source: U. S. Department of Commerce, *Economic Report of the President to 81st Congress, 1st Session* (Washington, D.C., 1949), p. 128.

"Other Durable Goods." This probably reflects the effect of reduction of civilian production during the war. Since this period, 1939–48, was one of relative prosperity, profits tended to show stability or growth. There is again the bulge in profits of all industries for the years 1946 and 1947. One of several industries which stands out with remarkable increase in profits is "Industrial Chemicals." This perhaps reflects the increased use of plastics and other chemical products developed during the war and converted to civilian use in the postwar period. There is also a definite upward trend throughout the period in the profits of the service industries. While profits may tend to move in the same direction for almost all industries, this exhibit indicates that they do not move at the same rate.

If the businessman is to avoid failure, it is essential that he be familiar not only with the factors which affect his profit but also with the nature and meaning of profit itself. Some of the factors affecting profits are within the control of the firm while others are external to the business and beyond the control of management. In both cases the businessman must, first, be able to recognize these factors and, second, attempt to bring about the proper adjustments within his firm so as to maximize his profit. Whether he will make adjustments to meet every event which affects his profits depends upon a number of factors. If he is attempting to maximize short-run profits, he will probably make more frequent adjustments. On the other hand, some of the opportunities for short-run profits may have to be foregone in order to obtain the largest possible long-run profits where the two are not in harmony with each other. Even if he desires to maximize his short-run profits, the complexity of his business organization may not permit it. Especially is this the case when much time is consumed in communication among the various divisions and departments of his firm.

THE MEANING OF PROFIT

In addition to the problem of deciding whether a certain move is profitable, the businessman is interested in knowing whether the results of his total operations are also profitable. The concept of profit is clouded with a variety of meanings. In general, it is thought of as the difference between income and expense, however these two terms may be defined. It is no secret that many corporations make up more than one profit and loss statement for a particular accounting period. Usually the statement provided for income tax purposes shows a profit figure different from that in the report to stockholders. How, one may well ask, can a firm have more than one profit figure for a given period? The difference arises primarily because of a difference as to the composition of costs for the period under consideration.

The Definition of Income

The determination of revenue is probably less difficult and controversial than that of cost. In the majority of business operations, revenues are received at frequent intervals and usually cover an interval of less duration than the accounting period. Ordinarily receipts are allocated in their entirety to the accounting period in which they are received. Exceptions occur, however, as in the case of the receipt of interest payments which cover more than one accounting period or when payments are made in a series of lump sums to cover services extending over many months. The construction of extremely large merchant and battleships would be an illustration. Payment might be made in full upon delivery, while the construction time covered two or more accounting periods. In this case there would be no revenue in the first accounting period but considerable outlay, and the records would show a loss. In the second period there would be extremely large profits. Therefore, some of the receipts expected at delivery would be allocated to the first accounting period on some arbitrary basis. The precise amount of revenue is known only within the existing framework of accounting practices and engineering knowledge. As opinions within this framework vary, so would the revenue allocated to the first period.

The Definition of Costs

Once the total revenue has been determined, the amount of profit depends upon the definition of the costs which are subtracted. To this extent, therefore, profits are determined by defining costs. Some costs are more submissive to definition than others; for example, such costs as labor and materials are more or less clearly defined from the accounting viewpoint. Difficulty arises chiefly in the allocation of accrued and deferred costs; of depreciation, obsolescence, development, and research costs; and of others which extend over more than one accounting period.

The amount which remains after all costs have been accounted for is what the businessman calls his "profit" for the period. Every item of revenue and cost has been accounted for in the records of the business, and the difference between revenues and costs, as defined, constitutes business profit. This profit figure, however, needs further analysis, since it results from several causes. It includes the ordinary markup from business operations, inventory revaluation, monopoly elements, if any, and possibly the effects of cyclical variations. The businessman is interested in the constituent elements of his profit figure. The nature and source of business profits have an effect upon such matters as price policy, level of production, dividend policy, and many others. In the case of a corporation, dividend policy may be affected by the fact that large profits of a temporary nature, if paid out, might affect the market price of the stock and drive it up to a price which could not be maintained. On the other hand, such a price rise might be desirable for the purpose of further financing. Profits which arise as a result of monopoly elements might be the cause of a revision of price policy so as to increase future profits, whether they be of a short- or long-run nature.

Another view of this profit figure would be taken by the economist, and this view is not without value to the businessman. The economist would define "cost" in a manner different from that of the businessman or the accountant. Not all the costs calculated by the economist appear in the accounting records; for example, many firms own property which is used in the business. Ordinarily, the cost of maintaining this property is charged as business expense, but the economist would add another item of cost to this property. He would determine, probably by estimate, what rental could be obtained for this property in the use for which it is best, or next best, suited. This amount less the cost of maintenance would be subtracted from the business profits as computed by the accountant. This "cost" which has been deducted is known as the "opportunity cost" of using the property in the present business. It is the income the firm gives up when it chooses to use it in its own business rather than hire it out to others for a rental. The subtraction of this "opportunity" or "imputed" cost from the business profits as computed by the accountant does not mean that the net return to the firm is reduced but rather that the amount shown as business profits is not entirely profits but contains some elements of a rental return for the use of property. The economist would do the same in the case of capital funds invested in the business. If these funds are owned by the firm, the economist would again impute an interest cost to them and deduct this amount from the business profits figures. For all factors owned by the firm to which a return can be imputed, the economist would make an appropriate deduction from business profits. The remainder would be smaller than the business profits as computed by the accountant. This remainder is what is known as "economic" or "pure" profit. Profit as computed by the accountant or businessman may contain elements of remuneration to the factors of production as well as economic profit. It is possible for a firm to show a business profit but an economic loss. The distinction between the two concepts of profit becomes important when, for example, one considers the alternative opportunities for his time, talents, and capital relative to their present use.

Noncontractual Nature of Profits

A business firm, whether newly organized or already in existence, makes use of land and buildings, hires labor of various degrees of skill, and maintains a fund of liquid capital (money) in order to conduct its operations. Factors of production are brought together in some disciplined manner for the purpose of producing a commodity or service. But these factors do not of themselves voluntarily join together. They must be organized into an efficient productive unit by an individual or group of individuals whose perspective of the results includes their expectations of success. Contracts are entered into with owners of capital goods and money for their use, with labor for its services, and with other firms for a supply of materials. All these persons are assured of an income of a contractual nature. What of the individual or group which assumes the responsibility for payment under these contracts? Ordinarily, he will be compensated by the profits. If there are no profits, the individuals who organized the business will not be compensated. If there are losses, these individuals, unless protected by legal limitations of liability, must meet the contracts by payments from their own funds. The nature of the income of these individuals, therefore, is different from those who receive an income fixed by agreement, in that it is noncontractual.

In a dynamic world one would be inclined to presume that an income of a noncontractual nature would be subject to wide fluctuation from one period to another. Exhibit 5 tends to support such a belief. This exhibit shows the percentage of the national income paid out to the various factors of production. It will be noted that the percentage distributed as profit shows a much greater degree of instability than do the other shares. This noncontractual income is not definitely assignable to a factor of production in the same manner as are wages to labor and interest to capital but inures to the owners of the business, because for the period covered no factor has a legal claim upon it.

The fact that profits are not assignable to a factor by contract raises the question as to what specific service the entrepreneur performs in exchange for profit. Is it a compensation for risk bearing, for skill of management, or for other reasons? The answer to this question depends, in the first place, upon whether we are talking about the economist's concept of profit or the accountant's measure-

Exhibit 5

PERCENTAGE OF NATIONAL INCOME ALLOCATED BY DISTRIBUTIVE SHARES, 1929–47*

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Wages and salaries	57.5	61.0	66.0	73.0	73.0	68.0	64.5	62.5	62.5	64.0
Income of unincorporated enterprises	9.3	8.3	8.0	7.0	8.5	9.6	8.9	9.2	9.1	9.1
Rental Income	6.6	6.4	6.2	6.0	5.1	4.2	4.0	4.0	4.3	4.9
Corporate profits:										
Before taxes	11.2	4.4	-1.2	-7.1	0.4	3.5	5.7	8.5	8.4	4.5
After taxes†	9.6	3.3	2.1	-8.2	-0.9	0.4	4.0	6.4	6.4	3.4

	1939	1940	1941	1942	1943	1944	1945	1946	1947
Wages and salaries	65.0	61.0	59.7	60.0	62.5	64.0	64.5	62.5	60.0
Income of unincorporated enterprises	9.6	9.5	10.7	9.2	8.5	8.4	9.0	11.3	‡
Rental Income	4.8	4.5	4.2	3.9	3.6	3.7	3.8	3.8	3.6
Corporate profits:									
Before taxes	8.9	11.2	16.6	15.5	14.6	13.1	11.2	11.3	14.0
After taxes†	6.9	9.9	9.1	8.2	6.7	5.5	4.9	7.0	8.4

* Does not add up to 100 per cent because of omissions and deviations.

† After federal and state corporate income and excess profits taxes.

‡ Not available.

Source: U.S. Department of Commerce, *Survey of Current Business*, and *National Income Supplement*, July 1947, February, 1948.

ment of it. These matters were discussed above. In the second place, the answer to the question depends on what we take to be the fundamental causes of profit.

The Businessman's Interest in the Nature of Profit

There are several reasons why a businessman should be concerned with the causes and concepts of profit. He may wish to know whether the investment in a particular business is more or less profitable than in another or whether his talents as an entrepreneur may be better employed elsewhere. The distinction between business profits and economic profits will aid him in reaching a decision.

Another reason for awareness of the distinction is in order to separate profits from remuneration of the factors of production. This is important when contracts with the factors must be renegotiated. After allowances have been made for payment of all factors, both on a contract and on an imputed basis, if a balance remains as economic profits, the factors under contract may feel that some of this surplus should accrue to them, but they are unable to make any claims against it until their contracts expire. When this happens, the presence of a surplus from past operations plus expectations of a surplus from future operations raises the problem of how this surplus is to be divided among the factors used in the business. Attempts to solve this problem introduce the question of the origin of the surplus. Does it arise because of the use of a factor with a particular skill or element of monopoly, because of conditions of operation within the firm, or from circumstances beyond the control of the entrepreneur as well as of the factors employed? The establishment of the origin of this economic surplus affects the bargaining power of a factor in its claims for incorporating a share of this surplus into a new contract.

Perhaps the most important reason for being aware of the origin of economic surplus is to protect and improve the net earnings of the business. A firm, for example, may be renting a choice location in which to carry on its activities. If the entrepreneur is convinced that the location is responsible for the high volume of sales which results in substantial net earnings, he may attempt to acquire ownership of the property so that his future earnings will not be jeopardized either by having to pay a higher rental at the time of signing a new lease contract or by failure to renew at all. If he is unable to acquire ownership, he may, depending upon his expectations of the future, attempt to secure a long-term lease at current rental. This would insure that any increment in his business profits would inure to him rather than to another individual or firm. To the extent that the current rental exceeds maintenance costs of the property, the business profits of the firm would be increased by acquisition of ownership. Another case is that of a firm which may increase its business profits by either horizontal or vertical integration. A competing firm may have an excellent distribution system but some weaknesses in production. The first firm may have just the opposite situation. If the first firm attributes the high earnings of the competitor to its superior marketing and distribution facilities, a merger or an acquisition may be desirable which would incorporate the complementary skills of the two firms and thus result in higher profits for both firms. This would be a horizontal integration. By such an integration one firm acquires the facilities of another for the purpose of greater profits. An illustration of vertical integration is the acquisition by several large steel users of steel mills in the period following the close of the recent war. Several firms, such as the Studebaker Motor Company and the Kaiser-Frazer Motor Corporation, purchased steel processing and fabricating mills. These purchases were made at a time when steel was in short supply, and the supplying firms were purchased in order to insure continuous operations, which are necessary to maintain profits in such large-scale operations. This meant that the companies had first claim to the production of the steel mills and would not have to compete with other buyers of steel if the mills remained under independent ownership. The rise in prices for steel would have diminished the profits of the automobile firms, whereas the purchase of the steel mills protected them both from price rises because of demand conditions and discontinuity of supply, which would impede smooth operations and thus adversely affect profits. Many of the railroads of the nation improved their long-run profit position during this same period. As a result of greatly increased operations due to wartime traffic, their profits increased substantially. Rather than distribute these profits in the form of dividends to stockholders, much of it was retained and applied toward the redemption of outstanding mortgage and debenture bonds, which, in turn, reduced the fixed charges of the companies. In other words, borrowed capital was replaced by owned capital, so that with the same volume of traffic the business profits of the railroads were greater. As rail traffic declined in volume after the war, the roads were able to show a better profit statement because payments for interest on capital no longer were made outside the railroad firm.

In the respective illustrations, while it is unlikely that the managements discussed these policies in terms of economic and business profits, it is apparent that they were aware of the distinction between the two concepts. By means of property rights they diverted payments to factors outside the firm to payments to factors within the firm and increased their business profits. These profits include imputed payments to these factors, but, since they are now owned by the firm, it is not necessary to make a distinction from the accounting viewpoint.

THEORIES OF PROFIT

Although it is difficult, if not impossible, to establish precisely the origin of economic profits, the businessman is, nevertheless, forced to reach some conclusion in order to make sound decisions affecting his firm. He must decide whether his profits arise from one source or another or a combination of sources. In the latter case he is faced with the additional problem of allocating some weight to each of the composite causes. Several theories of the cause of profit have been advanced. There will be discussed briefly below the theories of risk bearing, compensation for management, monopoly profits, windfall profits, and innovation profits. This list is by no means exhaustive but represents some of the more generally accepted theories of profit.

Profit as Compensation for Risk Bearing

This argument is frequently advanced by the entrepreneur and follows a familiar line of reasoning. The entrepreneur undertakes to organize the factors of production and, in so doing, assumes the risk of success or failure of the firm, neither of which is predictable in the initial phase of organization. He has a choice of accepting or avoiding this risk and, if successful, so the argument runs, is entitled to any surplus accruing after he has met all contractual obligations. This surplus is his reward for assuming risk and managing it successfully. He substantiates his claim further by pointing out that, if he is not successful in managing the risk, he alone must bear all the losses, while the factors under contract are compensated regardless of the outcome of the venture. This theory was developed by the earlier modern economists and perhaps had its roots in the system of private property and the form of enterprise which had grown up at the time of its development. It appears to have been developed at a time when a large number of new ventures were being undertaken and when many risks which were not then insurable or avoidable were lurking in the clouds on the business horizon. The initial risks in a commercial venture were very great and, for that matter, are still sizable today, although a number of risks are now insurable and shiftable, leaving uncertainty about the future as perhaps the greatest risk. Many risks are now selective and can be avoided by the businessman if he takes advantage of specialized institutions which exist for the purpose of assuming risk. One writer classifies as risks those unknowns which can be avoided by insurance of various kinds, while the unpredictable elements which cannot be avoided are classified as uncertainties.[2] The risk-bearing theory denies any share of an economic surplus to factors other than the entrepreneur. It is more a theory of the distribution of profits than of their origin. It assumes that profits arise because of the assumption of risks and, since the factors of production by contract have foregone the assumption of risk, the surplus belongs to the risk bearers.

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[2] Frank H. Knight, *Risk, Uncertainty, and Profit* (Boston: Houghton Mifflin Co., 1921), chap. ix.

Profit as Compensation for Management

This theory, while somewhat similar to that of risk bearing, differs in that emphasis is placed upon the management of risks and coordination and direction of the factors of production rather than on mere risk bearing. The efforts expended in decision making, such as the hiring of factors, selection of risks, selling policies, and forecasting the future, are a function of management, and profits are the rewards for successfully performing these functions. This theory implies that all profits are the results of successful management of a firm and denies the existence of profits for other reasons. According to this argument, the entrepreneur not only assumes the risk of success or failure of the enterprise but, once having made his investment therein, engages in active management of its affairs. Without this activity of management, there would be no enterprise and hence no profits. The factors of production would not be employed and would have no income. It is because the entrepreneur hires these factors and directs them in their activities that there accrues an excess of receipts over expenditures. This excess is the share of the entrepreneur for his function of management. To maintain the logic of this theory, it should be pointed out that the existence of losses are the results of unsuccessful management on the part of the entrepreneur. This is to say that there is a penalty for failure to perform the functions of management successfully.

Perhaps this theory, too, was developed before the corporate form of organization came into such widespread use. The theory depends to a large extent upon the identity of owner and manager. But, even in the corporate organization of business today, the idea of profits as a reward for successful management is not discarded. Where ownership and management are separated, the argument is frequently advanced that management should have a share of the profits because the executive officers are responsible for the existence of these profits because of their unusual talents and efforts in behalf of the business. In this instance the theory begins to take on some of the aspects of a theory of distribution of profits as well as of their origin. The establishment of profit-sharing plans for executives is a recognition of the part that management plays in earning profits for the business. It is an incentive plan to spur management to greater efforts to show larger profits from their activities and bring a larger return to both owners and managers. The theory places a premium upon managerial ability.

While many arguments can be advanced to support this theory, it has some limitations. The greatest objection is that it treats management as a specific function to be performed which places it in the same category as the other factors of production. Management must occur in any firm whether there are profits or not. An entrepreneur may follow the most generally accepted sound principles of management and yet show a loss at the end of the accounting period. In this case, although the services of management have been performed, no compensation is forthcoming. It is assumed that, whatever happens in economic life, it is within the ability of management either to control it or always to make the correct adjustments within the firm so as to avoid loss. There is little doubt that the success of many firms is due to an alert and energetic management, but the claim that *all* economic surplus is due to the function of management is not universally accepted.

Monopoly Profits

This theory is an attempt to explain the existence of economic profits on the grounds that there is some element of monopoly inherent in the organization of the firm itself or as a result of a factor owned by the firm. This element may appear in several forms, such as location, patent rights, franchises, product differentiation, property rights, and cartel agreements. It may equally well belong to a factor not owned by the firm but under contract to the firm at a price less than its real contribution to the firm. In such a case the factor will enhance its bargaining power for a higher price when a new contract is made if it can prove that its element of monopoly is responsible for the appearance of the economic surplus. This is another instance in which the origin of profits is closely allied to their distribution. If, for example, a firm rents a building whose location value increases during the lifetime of its lease, the owner of the building, upon the making of a new lease, will be in a position to demand a higher rental fee than he enjoyed in the past. In the meantime the surplus accruing to the firm because of the location factor belongs to the firm as a property right and is considered a business profit of the firm, but the owner of the building will take away those profits, upon the negotiation of a new lease, to the extent that he is able to demonstrate that the surplus arose because of locational monopoly. The future profits of the firm will be diminished by the increase in the rental fee. Where the factor belongs to the firm, the surplus accrues to the firm so long as the monopoly element is present, and the firm will show a surplus in accordance with the degree of monopoly. The same reasoning applies to patent rights or franchises. In the case of the latter, the taxing authorities may capitalize upon the monopoly elements of the franchise, when the date arrives for its renewal, by increasing the franchise tax.

It should be emphasized that monopoly is not permanent and that some judgment on the part of the businessman is required. Locational monopoly may disappear as the trading center of a community shifts. If such a shift occurs, the entrepreneur should carefully consider the purchase of land and building because of its strategic location If he anticipates that its locational monopoly may be seriously diminished within the forsceable future, he would do well to attempt to obtain a lease during the period when its location value will be greatest and avoid the liability of a useless location. An element of monopoly may appear because of political or personal favor with the executive of a customer firm. Before long-term commitments are made, these factors should be analyzed. On the other hand, there may exist a situation in which the entrepreneur is the larger purchaser of a certain product or service which is operating under monopolistic conditions. If he is able to contract for the product at a price which gives the producer larger profits, he may consider the acquisition of the supplier in order to increase the profits of his own firm.

Windfall Profits

When economic profits arise from some source external to the operations of the firm, they may be considered "windfall" gains. The sudden removal of a competitor by a tornado may bring about an increase in sales and hence a higher profit until such time as the competitor is able to re-establish himself. The unexpected discovery of petroleum in an isolated community increases demand for the products and services of local businessmen. The outbreak of World War

II brought sharp rises in demand for many firms and resulted in an economic surplus for them. Such gains are caused by conditions over which the businessman has no control and can be attributed to no factor of production, including management.

Other windfall gains are less clear as to their origin, as, for example, appreciation in the value of inventory during periods of rising prices. Such gains may well be the result of accurate forecasting on the part of management. The distribution of these gains among the factors of production raises very difficult problems. In the case of appreciation of inventory, management may claim a share on the grounds that it was its foresight which enabled the company to make such gains. This is to say, management assumed the risk of further price rises and, having successfully managed the risk, feels it is entitled to any surplus which may occur. In the case of a corporation in which management and ownership are separated, this argument appears to be a "one-way street," because few managements are willing to accept financial penalties when risks are unsuccessfully handled. The tendency in this case is to shift the loss (negative windfall profit) to the stockholders.

Innovation Profits

The innovation theory is concerned with the passage of time and the changes which occur over time. Perhaps the most widely known statement of the theory is that of Professor Schumpeter, who attributes economic profits to innovations by businessmen.[3]

The innovation theory can be described as follows: A firm introduces a new product or a new idea, which results in yielding an existing product at a lower cost, or differentiates its product, which results in a wider acceptance by consumers, or promotes various combinations of these ideas, which give the firm an advantage over its competitors. As a result, the firm enjoys an economic surplus from this advantage. Eventually, either new firms are attracted to the field by the profits of the successful firm, or competitors produce close substitutes and thus reduce the sales of the innovator. Or competitors may adopt the cost-reduction methods of the innovating firm, and the latter thereby loses its temporary advantage. This move injures the profit position of the innovating firm. All this requires the passage of time, but, when the adjustment has worked itself out, the advantageous position of the innovating firm has been lost and its economic surplus has disappeared. As the number of firms adopting the innovation or a sufficiently close substitute (an innovation on the part of a competitor) increases, the profits of all firms tend to decline. Some students of profit theory have labeled this the "friction" theory of profits, meaning that time tends to wear down the economic profits of the firm which first produced the innovation.

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[3] Joseph S. Schumpeter, *The Theory of Economic Development* (Cambridge, Mass.: Harvard University Press, 1934), chap. v.

Such a theory implies the freedom of new firms to enter the field without restriction other than that imposed by time—a lag during which the profits of innovation can be received. So long as such a condition exists and all potential competitors possess complete knowledge of events in the business world, no firm can show economic profits indefinitely. As soon as the time lags have been accounted for, the economic profits of all firms in the industry will disappear.

From the practical standpoint, however, there are many obstacles to the entrance of new firms, such as capital requirements, legal monopoly, control of resources by the innovating firm, and ignorance of the level of profits in the new field. So long as any of these restraints are effective in preventing the entrance of competitors, the innovating firm will show an economic surplus, assuming that the demand for the innovation remains the same. As an example, consider the case of a bakery firm which has a long-term lease for the use of space in a large railway terminal, the focal point of commuting trains. The lease contract contains a provision that the owners of the terminal will not lease space to a competing bakery firm. Noting, however, that many sales were lost because of the inability of clerks to serve customers in the space provided, the manager had purchased equipment for self-service and arranged his space so that there was a continuous line moving through the store. The result was lower costs and increased sales, which resulted in a higher profit. Since no new firm is able to enter the competitive area of the railway terminal, the economic profits of this firm will not be worn down with the passage of time, barring a change of tastes on the part of consumers. In a sense this may also be thought of as a monopoly profit, since the bakery firm has a monopoly of location and is able to protect this monopoly, that is, prevent competitors from entering the field by reason of its favorable lease contract. The distinction between the innovation and monopoly theories of profit is not always clear. In fact, the various theories of profit are not always mutually exclusive when applied to specific cases.

THE DISTRIBUTION OF PROFITS

The Individual Entrepreneur and the Business Firm

In the case of the individual proprietorship the term "entrepreneur" applies to the individual who organizes the factors of production and directs their activities. Ordinarily, he supplies the capital funds and some, or all, of the capital equipment used in the business. He performs the functions of risk bearing, management, and control of the internal affairs of the firm. Under the institution of private property he is entitled to any surplus inuring to the business after all contractual payments have been met. The distribution of the total receipts of the firm poses no problem for the entrepreneur during the life of his contracts with the various factors of production employed by him, but at the expiration of these contracts he attempts, in so far as he is able, to protect his share of the total receipts in making his contracts for the future. The factors with whom he is negotiating may seek a larger share of the firm's receipts and, if the entrepreneur is unable to pass on their demands in the form of higher prices for his products, he must consider whether he will be satisfied with a smaller share. It is at this point that he will consider whether the smaller share will compensate him for the assumption of risk, duties of management, etc. He may be able to convince the factors that they are not entitled to a larger share and thus defend his own share. The factors, on the other hand, may find their bargaining power enhanced or diminished, according to the source of the profits.[4] Once these contracts are made, there is no further problem of the distribution of the profits among the entrepreneur and the factors of production until the next period of negotiation. So far as the entrepreneurial share of the profits is concerned, there is no problem of the distribution of this share among the various components of entrepreneurship under the individual proprietorship. Management and ownership are identical.

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[4] This is not to imply that the bargaining power of factors is based solely upon the origin of profits. Opportunity cost, costs of production, and the degree of monopoly are also the basis of such power.

The Corporate Enterprise

The bulk of modern business is transacted by corporations, and, of this total, the larger share is transacted by corporations with absentee ownership. It is necessary, therefore, to examine the problem of profit distribution under these conditions.

We are not concerned here with a detailed discussion of the corporate form of organization but merely with some differences between that form of organization and the individual proprietorship.[3] In the latter case the individual proprietor is both owner and manager of the firm, and, as such, he performs all the entrepreneurial functions connected with the business. Under the corporate form, however, when the personal identity of the management and that of the owners are different, serious problems of profit distribution arise. A chief purpose of the individual proprietor is to establish a claim to the economic surplus incident to the operation of the business. This is important in the matter of recontract with the factors of production. Once he has established this claim to the satisfaction of all factors, he has no problem of distribution, since he is both owner and manager and can be clearly defined as the entrepreneur of the firm. The definition of the entrepreneur is not so clear in the case of a corporation, where managers and owners are not the same persons. There is a division of the entrepreneurial functions. The question then arises. How are profits to be divided between the entrepreneurial parties?

The answer to this question will vary with each individual case. Generally speaking, however, the answer will rest upon two basic considerations: first, the theory of the source of the profit and, second, the division of the entrepreneurial function. The first has been discussed above. Management may claim a lion's share of the surplus, arguing that profits are compensation for successful management, while the stockholders (owners) may likewise demand the larger share as compensation for risk bearing. In the case of windfall profits, stockholders may feel that such profits should be paid out in dividends and not shared with management, since they are not the result of management's efforts. Or the surplus may be the result of ownership of a patent right, which the stockholders might argue belongs to them and not to management Such arguments as these are based upon profit theories.

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[3] The partnership is omitted because of its relative unimportance as a form of

The second consideration—the division of the entrepreneurial function—is an attempt to devise a formula for compensating the two groups on the basis of the service performed by each in behalf of the corporation. It is a theory of the distribution of profit between the components of the entrepreneurial factor. It does not necessarily rely upon any particular theory of profit but leans heavily upon the concept of profit as a compensation for a service performed, whether it be management, risk bearing, or both. In a sense it encompasses all the theories of profit. Monopoly profits may be thought of as the result of an alert management's building up or acquiring the monopoly factor and the shrewdness and foresight of the stockholders in investing their funds in such an operation. Innovation profits are the result of management's willingness to risk its reputation and stockholders' willingness to forego dividends or to advance funds to finance the innovation. In any and all cases the two groups are performing some function for which they are compensated by the profits which arise.

The problem becomes one of establishing some criteria for executive compensation, and, once this is done, the balance of the profits inure to the owners in the form either of dividends or of retained earnings. There is no established labor market in which executives may be hired, in the sense that a firm can, for example, hire an electrician whose wage is the going rate or some previously determined union rate. When a firm is hiring a new executive, the element of opportunity cost probably enters the bargaining. An executive already employed or one who has just recently severed a connection has a fairly good idea of the value of his services when approached by a firm wishing to hire his services. But in any particular case the prospective executive may or may not wish to be hired for a salary alone but may prefer to be compensated partially on the basis of profits. He may expect to make some contribution toward increasing the profits of the firm and hence may wish to be compensated other than by a fixed salary. In other words, the prospective executive is willing to assume some risk, although it is a different kind of risk from that assumed by the stockholder. Where such profit-sharing plans exist, it is not possible to establish a market price for such executive services.

There is another problem which arises in this instance. The criterion of an executive's past earnings as opportunity cost is not always valid, since it depends on whether he was compensated by a board of directors from whom he was entirely independent or whether he participated in the determination of his own salary. One writer on the subject has stated: "Perhaps more important is the fact that only in a restricted sense can a market for executive ability be said to exist at all. Buyers and sellers are not independent. The chief executive is in a sense his own employer, within limits he frequently sets his own compensation."[6] In a corporation in which the management has control, this argument is not without merit. It has some weaknesses, however, where such managerial control is absent.

In a corporation in which there has been considerable growth and increasing profits, the criterion of executive compensation becomes rather nebulous. Management has made some contribution to this growth, no doubt; but how should their compensation be increased? Opportunity cost may play a very minor role in this case. An executive may be worth considerable to the firm which employs him but substantially less to some other firm, assuming it were possible to determine how much he would be worth to another. Failure to permit management to participate in increased profits may cause the firm to stagnate or fail to make the most of its possibilities. About all that can be said for any given case is that the distribution of the profits will depend upon the distribution of the property rights of the firm among various interested groups and the alternatives of management.

It would appear that the interests of management and stockholders would always be in harmony, since increasing profits of the corporation benefits both groups. This is true so long as a division of the profits between the two groups can be reached upon a satisfactory basis. But after the problem of compensation for management has been disposed of, other differences may arise between management and stockholders. Perhaps one of the more important is the retention of profits to finance further expansion, research, and other activities. Stockholders receive their compensation in the form of dividends, but, if management, through its control of the corporation, retains a substantial portion of the profits, dividends to stockholders are diminished. Management may also attempt to expand the business for reasons of power and prestige rather than profit, to the detriment of the owners. That is to say, ambitions of management may conflict with the maximization of profit for the firm. Again

[6] R. A. Gordon, *Leadership in the Large Corporation* (Washington, D.C.: Brookings Institution, 1945), p. 277.

the solution to these problems is not absolute. The group with the greater bargaining power will profit more in any particular instance. When that bargaining power is modified by change in the distribution of stockholdings, market conditions, opportunity costs, and other factors, then the distribution of the profits will also be modified. Active efforts are sometimes made to change this distribution, as when Mr. Robert Young, of the Chesapeake and Ohio Railroad, recently purchased in the open market sufficient shares of the New York Central Railroad to give him a voice in the management of the latter. Mr. Young stated that the purpose of his acquisition was to integrate the services of several lines in which he was interested. At about the same time substantial blocks of stock were purchased by Mr. Young in the Rock Island Railroad, and some observers believed that this was an attempt to integrate the New York Central and Rock Island services with a view to providing coast-to-coast passenger and freight service with a minimum of interruption. Regardless of the motive, such action modified the management and control of the interested groups and thus their participation in the policies and earnings of the firms.

Bonus Plans

Profit theories play their part in the distribution of corporate gains when executive compensation or employee bonus plans are under consideration. It is necessary when drawing up such plans to define, for purposes of distribution, what constitutes profits. As has been pointed out above, there is more than one definition of profits, hence the necessity for precisely defining them for the purpose of profit sharing. Profits before taxes are not the same as profits after taxes. The same is true with depreciation and obsolescence. There is the instance of a firm which was heavily indebted to a bank. In arranging terms of repayment, it was agreed between the two parties that all payments on principal would be subtracted before arriving at the final profit figure for the year. This was the profit figure the firm agreed to use in determining the amount of bonus to be paid to executives on the basis of profits. In addition to the definition of profit, the distribution of the profits in the form of a bonus may be based upon some theory of origin of the surplus. To whom, for example, should a windfall gain accrue? To management, stockholders, employees, or all three groups, shared in some arbitrary manner? The basis of this arbitrary division is not always the dictate of one of the groups, although it may frequently be the case where one of the groups has sufficient bargaining power. Usually it is arrived at by some method of compromise. The various groups may claim a share on their basis of their contribution, such as innovation, monopolistic position, opportunity cost, risk bearing, management, and control. Where the gain is pure windfall, it is difficult for any group to lay claim to it because of its contribution to the existence of the gain. The theory of windfall profits is important, however, when one group appropriates such gains over a period of time to the exclusion of others. The remaining groups may challenge the right of this group to such gains and call upon it to justify its claims. Occasionally a battle between stockholders develops over this issue.

Redistribution of Profits among Factors of Production

The distribution of economic profits over a period of time brings us again to the idea of innovation mentioned in an earlier section. There it was pointed out that, over time, profits of the firm tend to disappear with the entry of new firms into the field. But they may also disappear for other reasons. Suppose a firm employs a factor which enjoys a high degree of monopoly because of patent agreements. At the time of initial employment the factor entered into a contract with the firm for its services at an agreed price for a period of, say, four years. Because of the use of this patent right, the firm was able to innovate in its field and accumulate economic profits. At the end of the four-year period, renegotiation of contract price was begun with the factor, but the factor now demands a higher price, claiming that the economic surplus of the firm was due to its patent monopoly elements. The factor may threaten to withdraw its services unless its price is met, and, when the higher price is agreed upon, the firm will now show a smaller economic surplus, assuming all other conditions have remained the same. The disappearance of its profits has come not from new firms entering into competition but because of a redistribution of the profits among the factors employed. Part of the amount which once appeared on the profit and loss statement as a profit now appears on the same statement as a factor cost. Had this factor belonged to the firm, the economic profit would not have disappeared, and the distribution of the surplus accruing from its use would be determined upon some other basis and distributed to other factors. This disappearance of the profits of the firm may be caused by the success of any of the factors in establishing their claims to the surplus. The owners of the railway terminal referred to in an earlier section may, at the end of the lease period, demand a higher rental from the bakery firm in the new lease, which, if successful, will reduce the economic profit accruing to the bakery. During the life of the lease the surplus belonged to the bakery by agreement and appeared as a profit in the profit and loss statement of the firm. At the time of renegotiation, if the owners of the railway terminal expect that the future income of the bakery in that location will be as great as in the past, they may demand an annual increase over their old lease rate which would equal the expected economic surplus for the bakery firm for any one year. Practically speaking, the owners of the railway terminal may not know or be able to learn the amount of this economic profit, so that the amount they can actually secure as an increase will fall somewhere below the full amount.

The same reasoning may be applied to organized labor. In slightly more than a decade labor has risen from an unorganized group of competing workers to a well-disciplined body acting in a concerted manner. In a firm employing organized labor the union exerts some element of monopoly over the supply of labor for that particular firm. Since employment contracts are usually made on an annual basis, the union, at the expiration of its contract, will frequently seek a larger share of the firm's total revenue by claiming a share of the profits. To the extent that the union is successful in doing so (by refusing to perform further service until its demands have been met), the firm finds its economic surplus reduced. This assumes that the firm is unable to pass along the increased wage costs. The increased cost may be passed on to consumers of the product if the conditions of demand are such as to warrant a higher unit price. There is also the possibility of decreased unit cost which might accompany an expanded volume of operations, but this, too, can be accomplished only if the firm is able to market the increased quantity. The union's claim to a larger share of the surplus may or may not be based upon increased productivity. It may well claim a portion of a windfall gain in such a manner, depending upon the strength of its own monopoly of labor supply for this particular firm. Frequently a union, in support of its claim for higher wages, points to the profits of the firm as an indication of its ability to pay higher wages.

This line of reasoning may be applied to any of the factors employed by the firm. The success of their negotiations for a share of the economic surplus depends upon the acceptance of their claims. While no formula can be devised which will insure an equitable distribution of the economic profits of a firm to all the factors at all times, it is important that the businessman have sufficient knowledge of the origin of these profits, in so far as he is able, to guide him in his judgments of the claims the various factors may make upon him.

CONCLUSION

From the foregoing discussion it is apparent that the origin of profits is not of a single nature. Several of the theories are incomplete, in that they do not satisfactorily explain the existence of economic surplus but tend to emphasize the accrual of profits for some particular reason. The theory of windfall profits, for example, would hardly be an adequate explanation for profits which arise from exclusive control of a factor of production. We would be on more logical ground if we accepted each theory as contributing something to our general understanding of the origin and distribution of profits. From the businessman's point of view it is useful to understand the conditions which cause profits to originate in each of the theories, in order that he may, in so far as he is able within the framework of law and ethics, bring about such conditions in order to receive profits. Also, if he is familiar with the various theories, he will be better able to recognize when conditions necessary to their fulfillment are present and thus take advantage. Furthermore, when profits do arise, some of these theories may be useful in effecting a satisfactory distribution of such profits among the factors which produced them. When profits disappear, an examination of these theories may assist in determining what economic changes have occurred which affected profits. For example, a firm which has enjoyed a virtual monopoly of the supply of a raw material and has enjoyed monopoly profits may observe that its profits are declining. An examination may disclose that a substitute (innovation) has been developed for this particular material which is destroying the monopolistic position of the firm. In this instance the theory of monopoly and innovation profits are concerned, not just one of them alone. It is extremely doubtful if any one theory would ever suffice under any and all conditions.

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Case 1-1: ANDERSON'S SERVICE STATION

Early in 1939, Mr. Anderson decided to build a small retail gas station on a highway which had been routed through his property. This new highway, known as U.S. No. 45, crossed State Highway No. 83 near Mr. Anderson's home, which was located on the outskirts of the small village of Diamond Lake. This intersection was in a region locally described as the gateway to the lake region of Illinois and Wisconsin.

Mr. Anderson believed that he would attract business from three groups of patrons. First, there were the permanent residents of the village, about six hundred in number. Through personal friendship Mr. Anderson believed he would attract a substantial number of these people who, in the past, had been served by three small stations located in the village. Second, there were city dwellers who commuted between Chicago and their cottages on the northern lakes during the summer months. Third, there were the tourists using U.S. Highway No. 45, which ran between Northern Wisconsin and New Orleans, Louisiana.

A building was erected at the intersection of these two highways. The Texas Company, whose products Mr. Anderson had contracted to sell, provided and installed the equipment needed to operate the station. This equipment remained the property of the Texas Company, and no special charges were made for its use. The building cost $3,800 and was expected to last twenty years. The cost of the equipment was $1,926, with an expected life of fifteen years. In addition to installation, the Texas Company agreed to maintain the equipment. While the building was under construction, Mr. Anderson received an offer to rent the completed structure for a five-year period at $75 per month. This offer he rejected, and when the gas station was opened for business in June, 1939, Mr. Anderson resigned his position as a state highway foreman at a salary of $175 per month.

Early in 1941, Mr. Anderson learned that he would have to move to another climate because of his wife's health. He placed his service station on the market for sale. A friend became interested in purchasing the station as a going business, and, in arriving at a purchase price, Mr. Anderson presented the profit and loss statement shown in Exhibit 1. He pointed out to the prospective purchaser that in his accounting records he had made no charge for rent or wages because he owned the building and performed all the work connected with the operation of the station. At the time the station was constructed Mr. Anderson had borrowed $1,500 partially to finance the building. Of this amount he had repaid $500, but this had not been charged to the operation of the station. He had made the payments from the profits he withdrew. The interest payments, at 6 per cent, however, he had charged to the business. The balance of $2,300 was obtained

Exhibit 1

ANDERSON'S SERVICE STATION

PROFIT AND LOSS STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1940

Net sales			$10,699.68
Inventory at beginning of year	$ 282.27		
Purchases	7,154.94		
Cost of merchandise sold		$7,437.21	
Inventory at end of year		154.48	
Cost of goods sold			7,282.73
Gross profit			$ 3,416.95
Operating expenses:			
Electricity	$ 57.60		
Telephone	24.80		
Insurance	68.50		
Heat	72.00		
State inspection	5.00		
Donations	15.00		
Interest	60.00		
Taxes	248.96		
Advertising	40.00		
Bad debts	71.50		
Miscellaneous expense	118.00		
Total Expenses			814.36
Net Profit			$ 2,602.59

by cashing government bonds owned by Mr. Anderson, bearing interest at 3 per cent.

QUESTIONS

1. Was Mr. Anderson's business a profitable one? Was it worth his while to give up his highway job to enter his own business?
2. The prospective purchaser was earning $150 per month at the time he considered the offer to sell. Would it be advisable for him to purchase?
3. Are any adjustments necessary to show the correct "business profits"?

Case 1-2: CHARLES F. DARRELL AND SONS

For many years the firm of Charles F. Darrell and Sons had been engaged in the wholesale distribution of butter, eggs, and poultry in Chicago, Illinois. Although the firm had only a few employees and a relatively small amount of fixed capital, its total volume of business exceeded $4,000,000 annually. The bulk of its operations was in butter and eggs; poultry constituted only a small part of the business. The firm was founded by Charles F. Darrell during the latter part

Exhibit 1

BUTTER AND EGG COLD STORAGE MOVEMENT, CHICAGO, 1948

Week Ending		Butter (Pounds)			Eggs (Cases)		
		In	Out	On Hand	In	Out	On Hand
Jan.	3	104,290	855,263	2,312,780	68	3,952	60,450
	10	122,319	867,276	1,607,823	1,201	6,172	55,479
	17	183,022	525,574	1,325,271	3,481	6,498	52,462
	24	98,328	315,905	1,107,694	6,037	2,405	56,094
	31	148,950	403,256	853,394	19,437	6,538	68,993
Feb.	7	83,119	274,067	662,446	22,204	10,019	81,178
	14	170,942	291,221	542,167	27,456	16,218	92,416
	21	269,385	231,177	580,375	20,115	22,482	90,049
	28	146,197	228,259	498,313	6,213	13,867	82,395
Mar.	6	88,012	314,839	271,486	3,045	6,400	79,040
	13	75,168	194,601	152,053	11,241	2,788	87,493
	20	57,290	131,818	77,525	19,307	2,125	104,675
	27	51,584	42,012	87,097	47,011	675	151,011
Apr.	3	88,830	47,731	128,196	77,801	560	228,252
	10	202,607	169,096	161,707	73,360	683	300,929
	17	204,012	269,975	95,744	95,497	1,501	394,925
	24	142,166	127,923	109,987	110,443	378	504,990
May	1	236,898	130,810	216,076	159,355	357	663,988
	8	500,064	139,310	576,830	184,471	658	847,801
	15	799,350	191,256	1,184,021	164,163	716	1,011,248
	22	927,907	241,138	1,871,693	132,870	866	1,143,252
	29	1,677,793	208,436	3,341,050	126,993	2,338	1,267,907
June	5	1,640,919	153,914	4,828,055	93,004	883	1,360,028
	12	1,269,187	289,097	5,807,545	101,356	1,065	1,460,319
	19	1,415,778	200,040	7,023,283	103,941	2,081	1,562,179
	26	1,515,764	113,601	8,425,446	56,570	1,611	1,617,138
July	3	1,584,097	279,769	9,729,774	36,301	2,103	1,651,336
	10	1,973,599	148,287	11,555,086	35,532	2,951	1,683,917
	17	1,682,285	413,782	12,823,589	25,553	10,710	1,698,760
	24	1,555,396	235,119	14,143,846	16,144	3,314	1,711,590
	31	1,398,316	336,256	15,205,806	9,257	8,632	1,712,215
Aug.	7	1,220,225	114,051	16,312,070	10,101	13,718	1,708,598
	14	843,311	92,475	17,062,906	4,176	25,471	1,687,603
	21	1,236,377	174,117	18,125,166	1,693	36,722	1,652,574
	28	850,316	292,949	18,682,533	5,221	44,406	1,613,389
Sept.	4	637,389	283,353	19,036,569	6,750	62,840	1,557,299
	11	454,577	194,761	19,296,385	6,913	58,646	1,505,566
	18	505,414	512,942	19,287,857	2,048	89,397	1,418,217
	25	526,413	410,986	19,403,284	1,096	89,533	1,329,780
Oct.	2	225,898	480,597	19,148,585	30	111,148	1,218,662
	9	110,316	579,511	18,679,390	121	110,140	1,108,643
	16	287,345	952,740	18,013,995	216	146,823	962,036
	23	409,429	775,293	17,648,131	287	146,497	815,826
	30	380,421	761,473	17,267,079	960	145,106	671,680
Nov.	6	275,834	837,462	16,705,451		157,785	513,895
	13	82,730	736,001	16,052,080	518	125,900	388,513
	20	66,465	1,114,703	15,003,852	189	117,244	271,458
	27	51,444	1,571,379	13,483,917	270	65,078	206,650
Dec.	4	69,958	1,686,064	11,867,451	631	59,616	147,665
	11	99,620	1,480,576	10,486,495		25,046	122,619
	18	352,576	2,114,203	8,724,868		24,093	97,926
	25	406,508	1,487,875	7,643,501		8,435	89,491

Source: *Dairy and Poultry Yearbook* (Chicago, 1949).

of the nineteenth century and had been managed by John Darrell, a son, since 1920.

Since both butter and eggs were seasonal in production, the firm always had purchased heavily of these two items during peak production periods and placed them in cold storage to be drawn out as needed in off-peak seasons. For this purpose the firm had for many years used the facilities of the Ace Warehouse and Cold Storage Company, a bonded warehouse. As shown in Exhibit 1, the production of butter and eggs tended to rise about the first of April and to exceed the amount consumed throughout the spring and early summer. In August and September production tended to level out and decline until it came into balance with current consumption. During the remainder of the year consumption ordinarily exceeded production, and butter and eggs in cold storage were withdrawn to meet the excess of consumption over production. This practice of storage and withdrawal tended to insure a steady flow of butter and eggs to consumers throughout the year and to some extent leveled out the fluctuation in prices which would otherwise have occurred.

Eggs were purchased by the firm from country suppliers, local egg buyers, and local co-operatives. These contacts had been built up as a result of long years of experience. Local suppliers and buyers accumulated their purchases until a freight car had been filled and then offered the entire lot for sale to a dealer such as Darrell and Sons. A carload of eggs consisted of 480 cases of 30 dozen each, a total of 14,400 dozen. The firm, in a year handled approximately 300 carloads of eggs, most of which were purchased and placed in storage between April 1 and August 1. A very small amount of eggs was delivered in less than carload lots locally by near-by farmers. During periods of peak production, eggs were shipped in carload lots to the firm without a formal offer of sale. Such shipments were usually accepted and, if Darrell and Sons were unable to handle them, were easily disposed of to another dealer. Occasionally, it was necessary to request formal offer of sale from local buyers and co-operatives if the market showed any indication of inability to absorb an unlimited quantity. When such conditions existed, the firm tended to refuse offers from local buyers with whom they did only occasional business.

Although Darrell and Sons had been a successful and a reputable firm, its working capital requirements were far in excess of its available cash. It was, therefore, necessary to finance the purchase of eggs for storage by means of loans from banks. The carrying of large storage stocks involved the risk of price changes from the time of purchase until the stocks were withdrawn and sold. There was also the risk of deterioration of the eggs as a result of the passage of time, an ordinary business hazard covered by normal markups. Banks and other lending agencies were reluctant to extend a great deal of credit unless the loans were secured by a hedge on the Chicago Mercantile Exchange. It was the policy of most of these agencies to lend up to approximately 90 per cent of the value of the purchase at the time it was placed in storage, provided that the loan was secured by a hedge and the warehouse receipt. Accordingly, the firm had made it a practice, since the eggs futures market had been organized in 1918, to sell egg futures as it purchased eggs for storage in the spring and early summer, provided that the futures contract price reflected all charges and normal markup. To finance these purchases, the firm borrowed at its bank. In August of each year the firm had outstanding loans which varied from $1,500,000 to $2,000,000, depending upon the price of eggs. As eggs were withdrawn from storage during the winter and futures contracts fulfilled, either by delivery or by repurchase, the loans were repaid, so that by February of each year the firm had no obligations at its bank.

Exhibit 2 shows the expenses which were incurred by local egg buyers and co-operatives in preparing and transporting eggs to the wholesaler in Chicago as current supply or for storage. These expenses were in addition to the price paid to the producer for his eggs. Thus, if the price paid to the producer was 40 cents per dozen, the cash price paid by the wholesaler in Chicago would range from 49 to 52 cents per dozen. If the eggs were placed in storage, the cost of storage, insurance, repacking, etc., would be approximately ¼ to ⅜

Exhibit 2

COSTS TO LOCAL BUYERS OF PREPARING AND TRANSPORTING EGGS TO CHICAGO

(Per Dozen)

	Cents	
Collecting costs at country points (including local transportation and containers)	2.5	3.0
Grading	1.5	2.0
Candling	1.0	1.5
Country overhead	1.0	1.5
Packing	2.0	2.5
Freight to market	1.0	1.5
Total	9.0	12.0

cent per dozen per month of storage. It was a sort of tradition of the trade that the expected price of eggs at the time of withdrawal from storage, i.e., the futures contract price, must be at least 3 cents per dozen above the prevailing cash price to break even on the purchase and storage of eggs. Any smaller margin was considered unprofitable by the trade, since eggs were in storage for approximately six months. While there was still some margin between the costs of storage and insurance and the minimum 3-cent margin, the trade did not consider it worth while to risk the exploitation of such a small margin.

Early in April, 1949, the firm began to receive eggs in excess of demand and made preparation for storage. No eggs had been placed in storage by them since August, 1948, demand having been met by current receipts and withdrawals from storage stocks. All obligations had been paid at the bank when due. Several hundred cases of eggs were prepared and placed in storage, but no hedge was placed against them on the Chicago Mercantile Exchange. Mr. Darrell had been aware for some time that the price of October futures was less than 3 cents per dozen more than the current cash price. He attributed this to several causes, such as possible flush production in the fall months, general lack of confidence in current levels of commodity prices, and possible amendment of the government purchase pro-

Exhibit 3

QUOTATIONS OF OCTOBER EGG FUTURES ON CHICAGO MERCANTILE EXCHANGE AND CASH PRICES OF CURRENT RECEIPTS, MARCH, 1949
(Per Dozen)

Date	October Futures Close	Cash Price 70% Grade A and Over, Naturals*	Date	October Futures Close	Cash Price 70% Grade A and Over, Naturals*
1	46.85	45.50	16	47.00	44.50
2	47.00	44.50	17	46.95	44.50
3	47.05	44.75	18	47.00	44.50
4	47.10	44.75			
			21	47.20	44.50
7	47.35	44.75	22	47.40	44.50
8	47.30	45.00	23	47.55	45.00
9	47.20	45.00	24	47.60	45.00
10	47.25	45.00	25	47.85	45.50
11	47.25	45.00			
			28	48.15	46.00
14	47.20	45.00	29	48.00	46.00
15	47.15	44.50	30	48.20	46.50
			31	48.35	46.50

* Processed or treated eggs command a premium of about [illegible] cent per dozen. Eggs packed in wood cases command about [illegible] cent premium over Flat cases.

Source: *Chicago Tribune* daily quotations.

gram which could provide subsidies to producers instead of support prices, with resulting serious price declines in the market. By April 4, 1949, the firm had placed 34 carloads of eggs in storage but had not yet hedged them. This inventory required almost all the working capital of the firm. The bank advised Mr. Darrell that it would be unable to extend credit to cover purchases without a hedge.

Exhibit 3 shows the March quotations for October egg futures on the Chicago Mercantile Exchange as well as the current cash price for eggs during the same period.

QUESTIONS

1. Would you recommend that Darrell and Sons hedge their egg purchases regardless of future prices? Why?
2. Should the firm continue to buy eggs, if financing can be secured without hedging? What effect would this have upon the firm's profits? Would you, as the officer of a bank be willing to extend credit to this firm without a hedge? Why?
3. In view of the conditions outlined above, what action would you recommend that the firm take?
4. Are there any indications as to why the difference between the cash and futures prices for the month of March, 1949, is insufficient to cover the costs of carrying eggs in storage?

APPENDIX A TO CASE 1-2

THE NATURE AND PRINCIPLE OF HEDGING

Anyone engaged in the business of producing, merchandising, manufacturing, or processing agricultural commodities must carry inventories sufficient to support the desired level of operations. Because of ever-changing conditions of supply and demand, such commodities are subject to frequent and sometimes violent price changes. This causes the value of inventories of these commodities to vary with such price changes, subjecting the businessman to speculative profits and losses. These price risks are by far the most hazardous of all trade risks, and commodity handlers are anxious to minimize or avoid them entirely whenever possible. Grain elevators, flour mills, distillers, feed manufacturers, lard renderers, processors, exporters, and others similarly engaged prefer to forego the possibility of making speculative profits in order to avoid severe losses and to assure normal merchandising or service profits through the efficient operation of their businesses. While some businessmen may speculate upon these price changes in the hope of making large profits, others may feel they are financially unable to assume such risks. In fact, many firms dealing in agricultural commodities would not be able to enter or continue business if they had to assume all risks of price changes. If these risks could not be shifted to others, capital requirements of the firms in this field would necessarily be considerably greater. Businessmen can protect themselves against losses due to price fluctuations by *hedging* their purchases and sales of agricultural commodities.

Hedging may take place in any highly organized futures market. A futures market is one in which purchases and sales of a commodity for future delivery may be made. One may enter into a contract to buy or sell a certain quantity of wheat to be delivered during the month for which the contract is made. For example, in July, contracts may be made to deliver to a buyer or a seller during the month of December. A futures market is composed of two groups: those who wish to hedge their purchases or sales, and speculators. Those who hedge are attempting to protect themselves against adverse price changes. Speculators are those who assume the risks of price changes. They anticipate that prices will move in their favor. Speculators must be in the market in sufficiently large numbers so that no one of them individually may affect the market price. In a well-organized futures market, prices are arrived at by open and competitive bidding. The market will not function perfectly and effectively if prices can be manipulated by vested interests. A speculator, in effect, gambles that the price quoted today for delivery at some future date will not be the same as the cash price which actually develops in the month the contract matures. For example, suppose that in July, of any given year, December corn is offered in the market at $1.50 per bushel. If the speculator believes that the cash price of corn in December will be less than this amount, he will sell corn for delivery in December. If his forecast is correct, he will then be able, when his contract to deliver becomes due, to purchase corn in the cash market for, say, $1.25, and will receive $1.50 from the person who contracted to buy from him, thus earning a profit of 25 cents per bushel. On the other hand, if he believes that the price of corn in the cash market in December will be above the futures price as quoted in July, he will buy December futures. Then when the contract matures, again assuming his forecast was correct, he will accept delivery on his contract and then sell the corn in the cash market at a profit. Of course, if his forecast was incorrect in either case, he will suffer a loss on the transaction. Of importance, however, is the fact that there are persons in the market who are willing to undertake these risks of price changes.

Futures markets provide facilities for underwriting price risks. While similar to the principle of insurance, in that the risk is spread over large numbers, it is not insurance in the sense that the hedge is a guarantee against loss. A futures market offers possibilities of minimizing loss from price changes but does not necessarily eliminate them altogether. The risk incident to a decline in price on a terminal elevator full of grain, for example, is much too large for any individual or firm to carry without courting financial disaster; but through hedging in the futures market this large risk may be spread over hundreds of different persons and firms. These smaller hazards may be carried by competent risk bearers (speculators) who are ever-present in the market and willing to assume them, or they may be absorbed by other hedgers who desire to offset their own and different kinds of price risks.

But what is a *hedge*?[3] It is merely a sale of a commodity for future delivery which is offset by the ownership or purchase of a like quantity of the cash commodity (the actual physical product as distinguished from futures contracts). Or it is the purchase of a commodity for future delivery which is offset by the sale of a like quantity of the commodity in the cash market. In a "nutshell" the principle of hedging is that all purchases or sales of a commodity are offset by sales or purchases of an equivalent quantity of futures contracts in the same commodity.

The hedging of a cash transaction by a transaction in the futures market is made possible by the fact that cash prices and futures prices tend to move up and down together. Since most basic agricultural commodities are harvested once each year but are consumed throughout the year, the difference between the cash price and the futures price is usually made up of costs of storage, insurance, and handling. This difference between the present and futures price is known as the "spread." At times the spread changes as a result of various causes, such as shifts in demand, changes in weather conditions, and government activity in the market. The spread cannot long be greater or less than the cost of carrying commodities from the date of the cash transaction to the month of delivery. Whenever the spread deviates from this amount, speculators will tend to correct the situation. If the spread is greater than the cost of carrying the commodity, speculators will tend to sell futures and buy cash or "spot" commodities. This will work to reduce the price of futures and raise the cash price, thus lessening the amount of the spread and tending to make it equal to the cost of carrying the commodity. If the spread is less than the carrying cost, the speculators will buy futures and sell "spot."

Since hedging is the taking of an exactly opposite position in the futures market to that in the cash market, a loss in one market would be offset by a profit in the other. This may be illustrated as follows: Since the price of wheat and flour tend to move together, a miller may hedge his inventory. Suppose that on September 8, a miller purchases 10,000 bushels of wheat in the cash market at $1.20 per bushel. To hedge, he immediately sells 10,000 bushels of December futures at $1.26 per bushel. The difference of 6 cents is the normal carrying cost of wheat per bushel from September until December. The wheat is processed into flour, which the miller sells on December 10. On that date the cash price of wheat is $1.23 per bushel. The price of flour has moved accordingly. The miller will receive $1.23 per bushel for the wheat he purchased in September, now converted into flour, a loss of 3 cents per bushel including carrying charge. However, he is obligated to deliver 10,000 bushels to fulfill his futures contract made in September, at a price of $1.26 per bushel. He will purchase this wheat in the cash market for $1.23, making a profit of 3 cents per bushel. This will offset the loss incurred by the

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sale of his September wheat at a loss of 3 cents per bushel. Thus the miller has protected himself against a loss in the value of the wheat during the time he held it as inventory. Had the December cash price been 3 cents greater than the amount of his futures contract, he would have lost that amount per bushel in fulfilling his futures contract, but this would have been offset by a profit of a like amount per bushel when he sold the wheat (flour) purchased in September. While the miller is protected against a loss because of a decline in the price of wheat and denied the possibility of speculative profits in the event of a price rise, he earns his normal profit from the function of milling wheat into flour.

To demonstrate that the process of hedging is not a perfectly functioning one, suppose that the miller in the case above sold his flour on November 10 instead of December 10, although he had sold December futures at $1.26 per bushel when he purchased the wheat. Suppose that the cost of carrying wheat was 2 cents per bushel per month. The November cash price was $1.23 per bushel and December futures were $1.24 per bushel. The miller will sell the wheat purchased in September for $1.23. It had cost him $1.20 plus 4 cents carrying charge per bushel, resulting in a loss of 1 cent per bushel. In the futures market he will purchase December futures in order to offset his sale of December futures in September. But his sale of December futures is at $1.26 per bushel, while his current purchase of December futures is only $1.24, a gain of 2 cents per bushel. His net gain then, will be 1 cent per bushel on the hedging transaction. If the future price had increased in relation to the cash price, the miller would have suffered a loss on his hedging transaction.

It has been indicated that the ownership of an unhedged commodity involves an element of speculation on price movements, and this is true even though the commodity is held only for a short time. Fortunately, if a futures market is available, the owner of the commodity has the alternative of passing the risk on to others. Changes in weather conditions during the planting and growing seasons may bring rapid price changes as traders appraise these developments in the light of their effect on prospective production of grain. Insect and disease hazards, and changes in the level of business activity also create price risks. Hedging, therefore, offers an important means of eliminating these speculative risks.

There is another important advantage in hedging which deserves to be mentioned here. This pertains to the ability to obtain operating loans from banks. Credit can be secured much more easily against a hedged commodity because banks recognize that the assets of the hedger will not be impaired unexpectedly by adverse price movements. Short-term credit is important to processors who must purchase large quantities of agricultural commodities at harvest time and carry them until processed and sold.

The general purposes for which hedging in commodity futures are applied to businesses may be summarized as follows:

1. To protect purchases or inventories of a commodity not covered by actual sales of that commodity or its products;
2. To protect uncovered forward sales of a commodity or its products;
3. To protect, or earn, an expected carrying charge on commodities stored;
4. To protect or insure a given price for prospective or estimated production of commodities.

The hedge in 1, 3, and 4 above is accomplished through a sale of a like quantity of futures contracts, while in 2, it is accomplished through a purchase of an equivalent quantity of futures.

APPENDIX B TO CASE 1-2

THE EGG FUTURES MARKET

Eggs are used primarily as food or as an ingredient in the preparation of foodstuff. Liquid, frozen, and dried eggs, which constitute about 13 per cent of production, are utilized by commercial bakers and by manufacturers of candy and confections, salad dressings, egg noodles, and similar products. A little less than 3 per cent of the total egg supply is bought by hatcheries or held by farmers to replenish stocks. Additional uses of eggs are found in the preparation of feed, pharmaceutical and photographic supplies, leather tanning, textile dyeing, bookbinding, and ink manufacturing.

As a rule, eggs are sold by farmers to a local concentration point, such as a country store, egg buyer, co-operative, creamery, or packing-plant station. These buyers usually pass their accumulations to larger concentration points, where the eggs are graded, packed, and shipped in carload lots to the large centers.

Because a handler who accumulates eggs for carload shipments usually has a substantial inventory, approximately $6,000 tied up in each carload, it is advantageous for him to sell a contract for future delivery of the eggs at the time that he stores them, thereby insuring against a decrease in price during his period of ownership. For the same reason, many users or distributors of large quantities of eggs buy futures contracts so that they may be sure of the availability of eggs for their use or sale. Such a purchase also makes possible to them a normal manufacturing or operating profit and insures them against an increase in raw-materials prices.

The market for egg futures is traditionally an active one, with fluctuations registered monthly, weekly, daily, and even hourly. There are two primary classes of traders—speculators and hedgers. The speculator finds the futures contract to be sufficiently long term for him to make use of his knowledge and study of the egg market. Acting on this study, he assumes the market risk when the hedger sells futures contracts as a hedge against his unsold stock or when another hedger buys futures contracts to protect his supply. The presence of these speculators in the futures market in large numbers, who are always willing to buy and sell at a price, makes it possible for the hedger to pass on the risk of price changes

Egg handlers, wholesalers, and processors insure their warehouse stocks against price drops over the summer period by selling futures contracts on the Chicago Mercantile Exchange. Conversely, manufacturers, distributors, and others with future sale commitments, but without stocks of eggs, insure themselves against price increases by buying futures. Each has thus executed a hedge, the object of which is to eliminate or reduce his price risk.

The *Commodity Yearbook*, published by the Commodity Research Bureau, states that "studies of the results of futures trading in eggs in the nearly thirty years since the Chicago Mercantile Exchange was founded, demonstrate conclusively that great benefits are assured for both farmers and the consuming public through the price stabilization, insurance of normal operating profits and reduced costs which result from this link in the distributing system." This statement has been subjected to some criticism from various sources. On several occasions when the price of eggs has moved toward unusually high levels, speculators in the futures market have been singled out as the cause. While speculators make possible the futures markets, it is not certain that their role has always been one of benefits to those affected by the market.

APPENDIX C TO CASE 1-2

FEDERAL PRICE SUPPORT PROGRAM FOR EGGS

Under Section I of Title I of the Agricultural Act of 1948, eggs were supported at 90 per cent of parity until January 1, 1950. Monthly the parity price was adjusted for seasonal variations. Purchases were, therefore, made by the government at prices which were estimated to yield 90 per cent of parity. Throughout 1949 a support price of 35 cents per dozen at the farm yielded this percentage.

The general purpose of all price support is to maintain the purchasing power of agricultural products in relation to that of industrial products. During the war emergency, support was used to stimulate production. The program was continued as an aid to reconversion to a peacetime production basis and to help avoid the possibility of repeating the disastrous price declines which followed World War I.

The method used to support the egg market is at the discretion of the United States Department of Agriculture. The department's current policy is first to purchase dried eggs from driers who certify that they have paid support prices to the producers. The program is centered mostly in surplus producing areas, the midwest, and should be reflected throughout the country. It was felt that it would be impracticable to give individual support to the four and a half million farms that now contribute to the bulk of production.

If support through driers does not achieve the desired result, then purchases of frozen eggs will be made from breakers who have similarly certified to prices paid to the producers. As a last resort, shell eggs may be purchased in areas not served by driers and breakers.

In 1948, the department bought the equivalent of about 2,800,000 cases of shell eggs, or 1.7 per cent of the total production of that year. The program for 1949 was an extension of the 1948 program and continued on the 35-cent basis with a 2-cent premium paid to producers who deliver their own eggs to processors. The department had bought, through April 27, 1949, approximately 39,000,000 pounds of dried eggs, equivalent to roughly 4,000,000 cases of shell eggs.

In putting into effect the support program for eggs the department, through the Commodity Credit Corporation, offered to buy in unlimited quantities dried eggs from driers in accordance with regulations set forth above. The department paid the dried-egg processor $1.26 per pound for powdered eggs in barrels or $1.28 per pound when packaged in fourteen-pound containers. These prices are calculated to yield a price of 35 cents per dozen to producers on the assumption that one case of shell eggs will yield ten pounds of egg powder. The actual result has been a yield of ten and one-half to eleven pounds of powder per case. Consequently, the profit on dried eggs is actually greater than anticipated. In order to take advantage of this extra profit, driers have tended to offer country producers more than 35 cents per dozen, which, in turn, affects the cash price of eggs in Chicago.

Case I-3: C. C. WOODLEY (I)

For many years it has been the practice of the United States Post Office Department to contract with private carriers for transportation of the mails between the main post-office building, substation post offices, and the railroad stations in various cities. Bids for performance of these services are usually invited by the local postmaster through newspaper advertisements and notices posted on bulletin boards in post-office buildings. These announcements solicit sealed bids from interested parties and describe the character of the services in such manner as duration of contract, distance to be covered, frequency and timing of trips, type of equipment, bonding requirements of personnel, and provisions for modifying the contract during its lifetime. These contracts are usually awarded for a period of four years. The successful contractor is required to furnish equipment conforming to specifications in the announcement, personnel, bonds guaranteeing performance of service, and all materials and supplies necessary to fulfill the contract. In the larger cities the equipment is so specified as to prohibit its use for any other purpose without some alterations. Frequently, schedules do not permit a vehicle to be idle long enough to be useful for other purposes.

In September, 1929, Mr. C. C. Woodley was successful in securing a four-year contract of this type in a large city in northern New York.

His contract called for the provision of fourteen trucks varying in capacity from one-half to two tons. They were to be painted olive green in color and bear the inscription in gold lettering "United States Post Office," followed by a serial number to be assigned to each truck. Bodies were to be constructed of wood or steel and provide protection from the elements. All bodies were to be equipped with doors and locks. Mr. Woodley purchased eight of the trucks from the previous contractor and six he purchased new. The terms of the contract provided for a compensation of $28,550 per year for four years. The contract also provided for additional compensation for mileage covered in excess of that stated and penalties for failure to perform the required mileage where such failure was not beyond the control of the contractor.

Mr. Woodley personally supervised the operations under this contract. During rush hours and when drivers were absent, he acted as a driver. He retained several drivers employed by the former contractor, so that he had a crew of five full-time drivers, who worked twelve-hour shifts, and seven part-time drivers. One of the part-time drivers also served as a garageman and mechanic. Operations began on January 1, 1930.

In September, 1933, Mr. Woodley was again the successful bidder for a second four-year period beginning January 1, 1934. The terms of this contract were identical with the contract executed in September, 1929, with the exception of compensation. The new contract called for annual compensation of $27,200, although several miles per day had been added to the total distance traveled because of relocation of one of the railroad stations.

At the time of renewal of the contract Mr. Woodley, reviewing his expenses of operation, noted that he had been paying a premium of $4,700 per year for liability insurance on his fleet of trucks. This insurance was written by a large and reputable insurance company. During the period of contract from January 1, 1930, to December 31, 1933, total claims had amounted to $1,783.25, all of which had been promptly paid by the insurance company. None of the claims had involved a personal injury, and the largest single claim amounted to $356.75 This claim had resulted from the collision of one of the two-ton trucks with another truck carrying several large pieces of plate glass, which were broken. The average claim was about $25, and almost all the damage was the repairing or replacement of fenders, headlights, or doors. All Mr. Woodley's trucks were equipped with governors, which permitted a top speed of twenty-five miles per hour, the official speed limit of the city. None of the operations extended beyond the city limits. All trucks were kept in good mechanical condition and were inspected semiannually by the Accident Division of the Department of Public Safety. Commercial vehicles which passed such tests were insurable at standard rates regardless of age. Of the eight trucks purchased from the previous contractor, six were new in 1927 and two in 1928. All other trucks in the fleet were purchased new in 1929 by Mr. Woodley. There had been an annual turnover of about 50 per cent in the crew of drivers until about the end of 1931, after which the rate had dropped to about 10 per cent. This was attributed to the scarcity of jobs because of depressed economic conditions.

Effective January 1, 1934, the insurance company increased the annual premium on Mr. Woodley's liability insurance to $5,100 per year. In addition, the rate on his performance bond was increased to $285 per year because of an increase in the number of business failures. The automobile accident rate had increased in this city in the previous two years, and the rate of deaths per thousand, attributable to automobile accidents, had increased about 25 per cent in the first six months of 1933 compared to the same period of 1932. The agent of the insurance company suggested an increase in Mr. Woodley's liability limits because of the increasing tendency on the part of

Exhibit 1

C. C. WOODLEY

STATEMENT OF PROFIT AND LOSS, 1930–32

	1930		1931		1932	
Receipts		$28,550.00		$28,673.00		$28,579.00
Expenses:						
Salaries	$11,880.00		$11,430.00		$11,290.00	
Liability insurance	4,700.00		4,700.00		4,700.00	
Comprehensive fire and theft	1,300.00		1,300.00		1,300.00	
Garage rent	1,400.00		1,400.00		1,400.00	
Gas and oil	552.00		519.00		507.00	
Depreciation	1,700.00		1,700.00		1,700.00	
License fees	183.00		229.00		229.00	
Repairs	638.00		629.00		955.00	
Bond expense	175.00		175.00		175.00	
Total Expense		22,528.00		22,082.00		22,256.00
Net Profit		$ 6,022.00		$ 6,591.00		$ 6,323.00

juries to grant larger awards in cases involving personal injuries. Several recent decisions had been in excess of $5,000 for personal injuries where the victim was not totally incapacitated.

Mr. Woodley was of the opinion that he would be better off if he canceled his insurance and set up a reserve of $3,000 the first year and $1,000 to $2,000 each year thereafter. Exhibit 1 shows a condensed statement of profit and loss for the years 1930 through 1932.

QUESTIONS

1. Would you recommend that Mr. Woodley cancel his insurance and assume his own underwriting? Why? What effect would this have upon his profits?
2. Did the profits of Mr. Woodley arise from risk bearing?

Case 1-4 WARING DEVELOPMENT CORPORATION

In February, 1929, the Waring Golf and Country Club was incorporated under the laws of the state of New York for the purpose of operating a public pay-as-you-play golf links. At the time of incorporation there were three stockholders, who were also the officers of the corporation. The corporation was authorized to issue five thousand shares of stock of no-par value, and twelve shares were initially issued. Five were held by the president, five by the secretary, and two by the treasurer. The corporation had no assets other than a small amount of cash contributed by the president. The main occupation of the president was the practice of law. The secretary was a son-in-law of the president, and the treasurer was an older son of the president. None of the officers planned personally to operate the golf club. This was to be done by a paid manager who was hired at the time of incorporation.

The property which the corporation planned to operate was adjacent to a large city in upstate New York. It was owned by a real estate promotion company which had purchased it as part of a larger plot in early 1920. This company had intended to develop the entire area as a residential suburb. The population of the city was about 250,000 and, because of its strategic geographical and industrial location, was believed to possess potentiality for substantial growth. The original plot acquired by the real estate company contained 723 acres, and by 1925 approximately 200 acres had been converted into a residential area.

One parcel containing 320 acres had not been subdivided into lots and was lying idle. The north and west lines of this tract adjoined the city line, and the entire parcel was bounded by city and county highways of first-class surface. Early in 1925, the real estate company leased this plot, on an annual basis, to a group of individuals known as the Highland Golf Club, who undertook to make sufficient improvements to use the property as a golf course. In 1926 the Highland Golf Club obtained a lease for five years and completed an eighteen-hole course. The improvements were of the crudest kind, and the club catered to a small patronage. Greens were constructed by merely scraping flat an area of earth and planting bent grass. Their operations were limited in scope, and in 1927 the Highland Golf Club failed. The following year the course was leased to an individual by the real estate company, but this lease was not renewed for 1929. The Waring Golf and Country Club was formed and leased the property for a period of five years.

In August, 1930, the real estate company which owned the property was declared bankrupt. The parcels to the north and east of the golf club were sold at a bankrupt sale and were returned to farming operations from which they had never been fully removed. The golf club property was purchased at this bankrupt sale by the president of the Waring Golf and Country Club for a cash price of $6,300 and the assumption of a first mortgage of $7,100, held by the Federal Land Bank of Springfield, Massachusetts. The cash for this purchase was supplied by the president personally. Title to the land was transferred to the Waring Development Corporation, which was incorporated for the express purpose of holding the land. This corporation was authorized to issue five thousand shares of no-par stock. The officers were the same as those of the Waring Golf and Country Club, but the stock was held by the president, his wife, and their six children, each holding one share. The mortgage was replaced with one held by a local savings bank. The terms of this mortgage called for a reduction of the principal of at least $200 per year payable annually. Payments in excess of this minimum amount could be made at the option of the mortgagor whenever interest payments were made. Interest was due quarterly. Payments in excess of $1,000 in any one year incurred a penalty of one-half of 1 per cent of the total amount paid.

Upon incorporation, the Waring Development Corporation leased its property to the Waring Golf and Country Club at a rental of one dollar per year. The Waring Golf and Country Club agreed to make all required payments of principal and interest on the mortgage. In addition, it agreed to pay all costs of maintenance of the property, including insurance and taxes. Whatever equipment was necessary to maintain and operate the club as a business was to be provided by the lessor.

In the years following the purchase of the property by the Waring Development Corporation, almost all the profits of the Waring Golf and Country Club were used to improve the property. These improvements were undertaken at the option of the Waring Golf and Country Club and were not considered as payments in lieu of rent. In addition, the president of the latter corporation made cash contributions to the firm for the purpose of making improvements. These contributions are shown in Exhibit 1 No contributions were made after 1938.

Exhibit 1

CASH CONTRIBUTIONS OF THE CORPORATION PRESIDENT FOR THE PURPOSE OF PROPERTY IMPROVEMENTS, 1931-38

Year	*Amount*	*Year*	*Amount*
1931	$ 855.00	1935	$ 429.00
1932	1,142.73	1936	211.21
1933	916.36	1937	4,260.25
1934	2,722.93	1938	533.00

That portion of the profits of the Waring Golf and Country Club which was applied toward improvements each year is shown in Exhibit 2.

Exhibit 2

ANNUAL CASH EXPENDITURES FOR CAPITAL IMPROVEMENT BY WARING GOLF AND COUNTRY CLUB, 1931-41

Year	*Amount*	*Year*	*Amount*
1931	$ 329.52	1937	$3,521.27
1932	433.51	1938	2,300.64
1933		1939	684.25
1934		1940	1,121.98
1935	716.05	1941	327.44
1936	1,002.13		

Any balance remaining as net profits each year after expenditures on capital improvements and payment of taxes was turned over to the president of the Waring Golf and Country Club. He considered such payments as partial repayment of his original cash contribution of the purchase price of the properties in addition to the numerous cash contributions he had made toward capital improvements. From the time of incorporation until 1936 such payments to the president had been only nominal. Exhibit 3 shows the net profits, after taxes, of the Waring Golf and Country Club from 1937 to 1942, when operations were suspended because of the impact of World War II.

Exhibit 3

NET PROFITS, AFTER TAXES, WARING GOLF AND COUNTRY CLUB, INC., 1937-42*

Year	*Amount*	*Year*	*Amount*
1937	$3,347.50	1940	$2,007.19
1938	2,583.21	1941	1,183.66
1939	2,991.76	1942	129.65†

* Exclusive of amounts expended on capital improvements.
† Deficit

In March, 1946, the Waring Golf and Country Club, Inc., reopened for business. During the wartime shutdown the properties had been maintained in good condition. There had been some revenue from the rental of several buildings and this had practically covered fixed expenses. The need for cash had been met from the personal funds of the president. With the reopening for business in 1946, rates were adjusted upward in line with rising prices. Exhibit 4 shows a condensed profit and loss statement for the Waring Golf and Country Club, Inc., for the years 1946 through 1948.

In March, 1948, the president of the Waring Development Corporation was approached by a real estate development company of Detroit, Michigan. This company proposed a joint development of the land owned by Waring Development Corporation as a residential area. The serious shortage of housing and the excellent location of the Waring property afforded an ideal opportunity for housing development. In addition to the expense of constructing dwelling units, there would be heavy expense for the purpose of laying water mains, paving streets, etc. Estimated profits, if the undertaking were successful, would have amounted to approximately $200,000 each for the real estate company and the Waring Development Corporation. This offer was rejected because of the large amount of capital contribution which would have been required of the president of the Waring Development Corporation.

In January, 1949, the vice-president and personnel director of the largest industrial corporation in the city approached the president of the Waring corporations with a proposal to purchase the property and equipment of the two corporations. The industrial corporation employed about six thousand persons, many of whom patronized the

Exhibit 4

WARING GOLF AND COUNTRY CLUB, INC.,
CONDENSED PROFIT AND LOSS STATEMENT, 1946-48

	1946		1947		1948	
Revenue:						
Annual memberships		$ 2,500.00		$ 2,625.00		$ 3,050.25
Daily fees		9,007.25		10,221.50		12,453.25
Rental of stables		3,200.00		3,200.00		3,200.00
Restaurant and bar		4,721.57		5,179.44		7,321.19
Lockers		180.00		180.00		180.00
Total Revenue		$19,608.82		$21,405.94		$26,204.69
Expenses:						
Depreciation	$1,927.50		$2,401.00		$2,900.00	
Interest	173.25		153.25		133.25	
Mortgage payment	200.00		200.00		200.00	
Salaries	8,527.33		8,534.25		9,136.25	
Insurance	229.30		229.30		229.30	
Social security tax	85.32		86.14		92.11	
Unemployment tax	255.96		256.21		287.54	
County and state taxes	458.21		473.19		501.21	
Materials and supplies	1,181.23		1,196.14		1,383.42	
Water	321.29		226.13		291.36	
Total Expense		$13,359.39		$13,745.91		$15,154.44
Net Profit (before taxes)		$ 6,249.43		$ 7,660.03		$11,050.25

Waring Golf and Country Club. The corporation desired the property for the purpose of converting it into a recreational center for the exclusive use of its own employees. An initial offer of $225,000 in cash was tendered for both the operating and land-holding corporations of Waring. There was nothing to indicate that this offer was final.

In considering the offer the president of the Waring corporations noted that he was not active in the management of the golf business. The paid manager, hired in 1929, was still with the club and his services were very satisfactory. The riding stables, restaurant, and bar were operated on a concession basis and entailed no problems of management other than the securing of concessionaires occasionally. The trend of profits since the reopening of the club in 1946 was noticeably upward, and the president was optimistic about a further increase in the future, since accommodations were being prepared to handle additional activities.

The balance sheet of the Waring Development Corporation showed assets of $13,400 and liabilities of a like amount, of which $6,300 was due the president of the corporation personally and the balance of $7,100 represented the original amount of the mortgage. The mortgage had actually been reduced to $2,350 by January, 1949, of which $2,400 had been paid from the personal funds of the president. No entries had been made on the books of the corporation to show this change. On the advice of the president the Waring Golf and Country Club had not paid the annual rental of one dollar, so that the books of the corporation showed no transactions since its organization.

QUESTIONS

1. Have you any criticisms of the amounts shown as "net profit before taxes" in Exhibit 4? Would you say that these figures represent the correct "earnings" of the Waring Golf and Country Club? Are "profits" and earnings" synonymous?
2. If the Waring Development Corporation were owned by parties independent of the owners of the Waring Golf and Country Club, would the rental be other than one dollar per year? Suppose that under such independent ownership the lease were on an annual basis. Would the rental be fixed at the same rate for the years 1946, 1947 and 1948? What effect would this have upon the profits as shown in the statement of profit and loss? How much rent could the Waring Development Corporation obtain from the Waring Golf and Country Club, assuming the two corporations to be independent of one another.
3. Would you recommend that the sale be made on the terms proposed? If you recommend a counteroffer, what price would you suggest? Why?

Case 1-5: THE NEP PEN COMPANY

The Nep Pen Company was organized in 1915 to manufacture fountain pens. From the beginning it was the policy of the company to produce only a high-quality product and to price it accordingly. All manufacturing operations were carried on in the company's own plant. No attempts were made to compete with other pen manufacturers on the basis of price. This policy had proved successful, and in 1921 the company undertook the manufacture of mechanical pencils under the same conditions. The same year the company became a subsidiary of the Stationery Products Corporation of America, but the parent company made no effort to interfere with the management of the Nep Pen Company or any of its policies. The Nep Pen Company continued to prosper and during the 1920's was selling its products in a national market. Its products were marketed under a brand name and enjoyed a reputation of high quality. It sold its products direct to retailers through its own salesmen, who were compensated by salary and commission. It had also developed an efficient repair service, which was maintained at the factory. While the management of the company was rather conservative, the company had improved its products by the development and use of its own and other patents and the use of new materials.

Following the economic collapse of 1929, the company continued its earlier sales policies but operated at a sharply reduced level—at a deficit in 1932 and 1933—but made no reductions in price of its pens and pencils. A less expensive model of its pen was placed on the market, but this was withdrawn in 1935. The company, while still known for its high-quality product, slipped from third, in volume of sales, in 1929, to seventh in 1940. During the second World War the company obtained government contracts for its pen and pencil and devoted its unused capacity to the manufacture of time fuses. It also operated a fuse plant in another city for the government during this period, but this operation was dropped at the end of the war. In 1945 the company expanded the manufacture of pens and pencils to capacity and enjoyed very profitable operations. In 1946 capacity was increased about 10 per cent by the addition of new equipment. In the spring of 1948 operations were reduced to about 70 per cent of capacity because of a decline in demand. This decrease was attributed to the availability of other-quality pens at lower prices, but the management of the Nep Pen Company gave no indications of revising its prices downward. At current prices of materials and labor, the company could operate at 55 per cent of capacity and break even.

In February, 1949, Mr. James Wilson acquired control of the Stationery Products Corporation. Examination of the annual report of the Nep Pen Company disclosed to Mr. Wilson the decline in the company's relative share of the fountain-pen market and also that the company was operating at about 60 per cent of capacity. Mr. Wilson called a meeting of the executives of the company for the purpose of improving the profit position of the subsidiary. He learned that the company had not made a radical change in the appearance or construction of its pens or pencils since 1942. At that time an improved filling mechanism was introduced, and the barrel, cap, and point were streamlined. No special advertising was undertaken at the time of introduction. The company followed an advertising policy of describing the mechanical operations of its pen and its superiority over the performance of competing pens but had used little emotional appeal. Since the introduction of this new model the number of pens returned for repairs had declined about 10 per cent.

Research in engineering and design was carried on by the company engineer. While this official had constantly experimented with variations and proposed improvements, he had no immediate plans for a change in the present model. Mr. Wilson noted with interest that, although the engineer had experimented with many "ball-point" pens, the company had not attempted to produce and market such a pen. The engineer believed that the ball-point pen which he had produced experimentally was as good as any on the market and superior to some. It was not placed on the market, since the president of the company felt it did not measure up to the usual standards of quality for which the company was well known. Mr. Wilson was aware that a large number of these pens had been sold and believed that a good ball-point pen, if placed on the market in a short time, would put the company back in a highly profitable position in the near future. He therefore strongly urged the management to undertake the manufacture and sale of ball-point pens. To this proposal the management strenuously objected on the grounds that it would lose money rather than show a profit. Mr. Wilson then requested that the president of the company prepare a report on the market for ball-point pens and submit it to him at the earliest possible date.

Within a week, the president of the Nep Pen Company submitted the following report:

The ball-point pen was introduced to the American market in November, 1945, by the Reynolds International Pen Company of Chicago, Illinois. The first sale was in New York City, and in the first week 30,000 pens had been sold at the introductory price of $12.50 each. This pen had a tiny ball-bearing point, was guaranteed to write at least two years without a refilling, and would write under water, on paper, cloth, and blotters. This pen was examined by the engineer of the Nep Pen Company, who believed that the pen could be produced for about fifty cents if produced at a rate of 10,000 per day.

For the first six months of the Reynolds International Pen Company's existence, ending January 31, 1946, it reported sales of $5,674,329 and profits, after taxes, of $1,558,608. The original investment in this company was estimated at about $26,000. Early in 1946, the Reynolds company announced the purchase of a new factory in Chicago to increase output to 30,000 pens per day.

In May, 1946, a rival company, the Ball Pen Company of Los Angeles, California, placed a ball-point pen on the market to retail for $9.95. It reported a backlog of 350,000 orders. Another rival, the S. Buchsbaum and Company of Chicago, Illinois, placed its ball-point pen on the market to sell at $12.50 each, and stated that it expected to sell 150,000 pens the first year. In the same month the Kimberley Pen Company of Los Angeles, California, produced a ball-point pen to retail for $12.50 and reported 250,000 orders on hand. The W. A. Sheaffer Pen Company of Fort Madison, Iowa, announced it would have a ball-point pen on the market in the fall of 1946. The Parker Pen Company of Janesville, Wisconsin, was silent on its plans for a ball-point pen.

In July, 1946, the Reynolds Company put a new cheaper model ball-point pen on the market at $5.85. This was the lowest price on the market. The original pen was kept on the market at $12.50, but the August, 1946, shipments of this model were only 125,000 compared to 450,000 in June. The president of the Reynolds Company attributed this decline to the usual summer decline in buying but, at the same time, stated that the cheaper model was put out because competitors would soon appear with cheaper pens. In September, 1946, the Reynolds Company reported a profit of $2,678,815 for the first year's operations.

In October, 1946, Eversharp, Inc., put a ball-point pen on the market at $25.00 plus tax. The company, at the time, was producing 30,000 pens per day and was sold out for months. In the same month, the Eagle Pencil Company put out a pen for $10.00 and was reported to be sold out until well into 1947. During the fall of 1946, new companies producing ball-point pens were coming into the market weekly.

During the summer of 1946, the Reynolds Company cut the price of its $5.85 pen to $3.85. In February, 1947, the company put out new models of the pen to sell for $2.69 and $1.69, respectively. In order to clean out his stock of obsolete $3.85 pens, he sold them to a jobber at a price so low that they could be retailed for $1.00. The prices of these obsolete pens opened in the retail stores at 98 cents and fell to 84 cents within a few days. The demand at this price was very heavy, and the Reynolds Company resumed production of the obsolete model at a reported rate of 80,000 pens per day. The pens sold for less than $1.00 all over the United States. By September, 1947, these pens were selling in retail stores for 69 cents.

The second week in September, 1947, the Reynolds Company offered its factory for sale. The reasons stated for the offer for sale were that Mr. Reynolds, the founder of the company, wished to devote more of his time to aviation interests and also to convert the assets to cash to avoid tax difficulties in case of death.

In May, 1948, Eversharp, Inc., reported a deficit of $3,416,985.23. The blame for this deficit was placed upon the experiences with the ball-point pen. The company had spent heavily on plant to meet the demand when the pen was placed on the market. It had lost money replacing the insides of the pens free of charge. The company had put out a pen to sell for $15.00. This was similar to the model produced earlier for $25.00. The $15.00 pen was reduced to $7.95 early in 1948, and a new model introduced for $5.95.

All the companies producing ball-point pens had numerous complaints about the mechanical defects and failures of these pens. While the pens were produced under several patents, they operated on about the same principle of filling and flow of ink to the ball point. Even the best of such pens were subject to sudden failure. Part of the difficulty was attributed to the composition of the special ink required and part to the engineering of the pen. The ball-point pen which the Nep Pen Company had produced in the laboratory was subject to these same criticisms.

The president of the Nep Pen Company pointed out to Mr. Wilson the experiences of Eversharp, Inc., and strongly objected to undertaking the manufacture of ball-point pens. He doubted if a sufficiently large volume could be sold at present prices to show even a normal markup. While he favored no aggressive move of any kind because of the company's experience during the depression of the thirties, he proposed a promotional campaign to increase demand for the present pen rather than the introduction of a ball-point pen.

QUESTIONS

1. Do you agree with the president of the Nep Pen Company in recommending against the introduction of a ball-point pen? Why?
2. What was the nature of the profits of the Reynolds International Pen Company?
3. Do you believe that timing of introduction of a ball-point pen was a factor in the losses of Eversharp, Inc.?

Part II

ANALYSIS OF DEMAND

THE PRACTICAL importance of understanding demand is evident from the fact that the income of nearly all business firms is dependent upon the demand for the goods or services which they sell. Demand calculations are reflected in the operating plans of most companies which are based on estimates of sales. Sales budgets—as well as budgets for expenses, finance, personnel, advertising, and production—require estimates of demand.[1] Most firms also have the problem of setting prices for the products they sell, and this requires an estimate of demand. The most difficult problems of business management are frequently those associated with analysis and manipulation of demand.

THE CONCEPT OF DEMAND

Sales Estimates and Demand Schedules

Predicting sales volume is an art which depends primarily on the skill and judgment of the businessman. The economist, however, can provide some assistance in this difficult task. By breaking up the problem of estimating sales into its logical components and by pointing out relationships of cause and effect between the facts of a business situation and the revenue results, he can improve the accuracy of sales estimates and therefore the profits of the company.

In estimating sales a businessman may be concerned with one product, with several products constituting a line, or with all products sold by his firm. There are two commonly employed methods of compiling sales estimates. One involves making estimates in terms of physical volume, such as number of units or pounds, yards, or other common measure. The unit price of the product or average price of

[1] "There can be little doubt that the safest procedure in attempting to build up a master budget is to start with the estimate of sales for the coming period . . . *If the work of sales forecasting is properly done,* it marks the definite limits of activities elsewhere in the program. So fundamental is this relationship that one may well agree with the statement, 'A complete budget system is only as good as the *accuracy of the sales forecast*'" (Howard T. Lewis, *Procurement Principles and Cases* [Chicago: Richard D. Irwin, Inc., 1948], p. 671).

several products can then be multiplied by the estimated number of physical units, resulting in a sales estimate in dollars for that product or line. Addition of similar dollar totals for other lines gives total estimated sales volume for a multiproduct company. The second method—one which is frequently used in firms handling a number of products—calls for an aggregate sales estimate made directly in dollars, with no initial calculation of sales in physical units of product. Although widely adopted, this method of calculating planned sales hides the underlying relationship of price and quantity demanded during a particular period of time. It is this price-quantity relationship with which we are first concerned in the analysis of demand.

A businessman who attempts to estimate how many units of a product he can sell during a certain month or year is immediately aware that the amount sold depends on the price at which he offers the product. At a high price he ordinarily discovers that fewer units can be sold than at a low price. The fact that price is so influential in determining the amount demanded led economists at first to concentrate attention chiefly on price-quantity relationships, to the exclusion of other factors influencing demand. Demand came to mean a *system* of price-quantity relationships, more being demanded at a lower price, less at a higher. Such a system of prices and quantities, called a "demand schedule," is shown in Exhibit 1. In this case it pertains to the entire market demand for the commodity wheat. When the tabular information in Exhibit 1 is presented in graphic form, as in Exhibit 2, it is called a "demand curve."

Exhibit 1

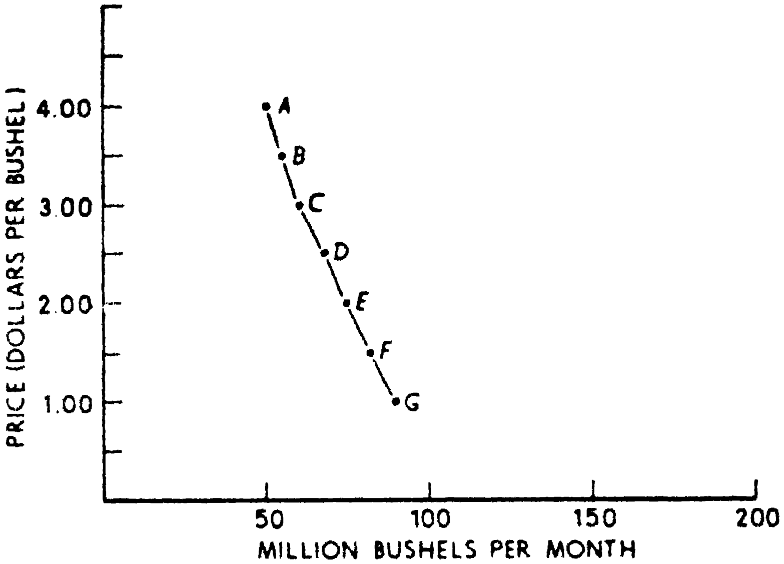
DEMAND SCHEDULE SHOWING RELATIONSHIP BETWEEN PRICE AND QUANTITY OF WHEAT SOLD

	Price of Wheat per Bushel	Quantity Demanded Millions of Bushels per Month	Value of Sales (Price × Quantity)
A	$4.00	50	$200,000,000
B	3.50	54	189,000,000
C	3.00	60	180,000,000
D	2.50	68	170,000,000
E	2.00	75	150,000,000
F	1.50	82	123,000,000
G	1.00	90	90,000,000

The demand schedule and the demand curve are drawn on the assumption that all market conditions remain unchanged. The only

Exhibit 2

DEMAND CURVE FOR WHEAT



change is that of price, which induces a change in the amount demanded. The demand concept of economists, therefore, is an abstract tool of analysis, not a description of actual market facts. In examining Exhibit 1, the reader should note that the quantities of wheat in the second column are those which *might have been demanded* at the prices indicated. They are not the actual quantities consumed, historically, at these prices in any given years

Market Demand and the Firm's Demand

The early economists applied the concept of demand only to entire markets, such as that for wheat. Demand, in this sense, is the aggregate of the individual demands for a commodity on the part of all buyers in the market. Subsequently it became evident that each business company is concerned primarily with the demand for its own product. In most cases the company's demand curve resembles the market demand curve, in that more units of product can be sold at a lower price, less at a higher. The market curve, however, is usually less sensitive to price changes than is the demand curve for a firm. One evidence of this is the fact that a company, by reducing price, can frequently expand its sales at the expense of other firms in the industry (at least for a short time). In this case the expansion of sales is at a rate greater than would be possible if all firms in the industry cut prices.

Elasticity of Demand

A company may discover that, as it reduces price, the increase in the number of physical units sold is so great that total dollar sales also increase. If, instead of lowering, the company raises the price of its product, it may discover that the increase in unit price is not enough to compensate for the decline in physical units sold. Dollar sales volume decreases. We describe the demand for this company's product as "elastic" at this price level.

If, in the case of another product, the company reduces price, only to find that the increase in sales of physical units is relatively small, dollar sales volume declines. Conversely, an increase in price may lead to a relatively small decline in the number of units sold, and dollar sales return may actually increase. The company's product is in "inelastic" demand at this price level.[2]

Only in exceptional cases will the results of price reductions (or of price advances) be the same if the changes originate from differing levels of price. That is, the elasticity of demand at different levels of price is likely to vary. A 10 per cent price cut beginning at the level of one dollar will probably not produce the same effects as a 10 per cent cut starting at fifty cents.

Now it is obviously a matter of importance for a company to know whether the products it sells are in elastic or inelastic demand. The prices it sets must be determined with some regard for the amount of revenue which will be brought in at these prices. The extreme of elasticity is found in agriculture, where individual farmers (in the absence of government restrictions on production) are able to sell successive amounts of product such as wheat at the *same* price up to the limit of their capacity. This is because each of the 1,364,000 wheat farmers produces such a very small part of the total crop that,

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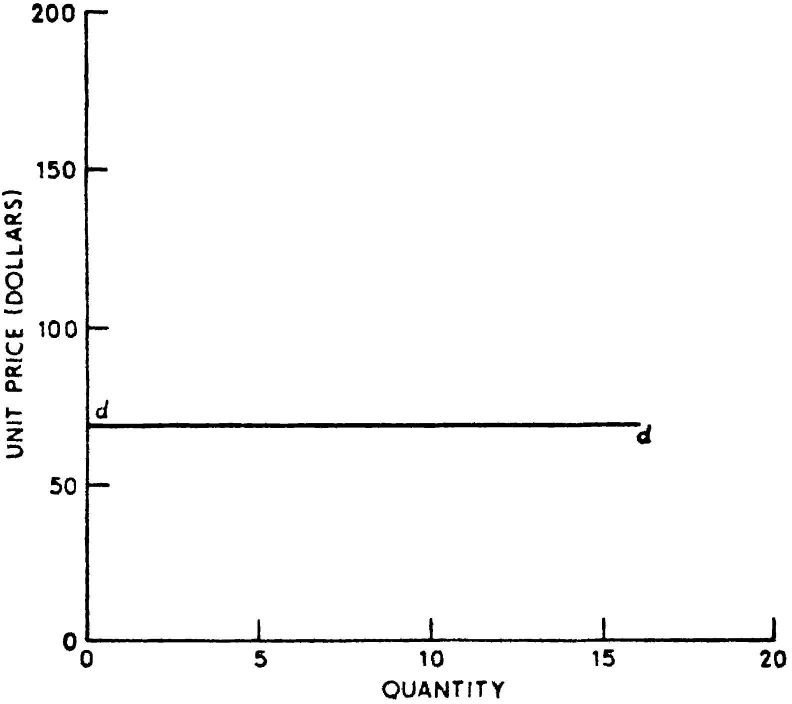
[2] "In numerical terms the elasticity of demand or supply may be defined as *the percentage change in the quantity (demanded or supplied) which would result from a 1 per cent change in price*. If the elasticity of supply of a given commodity is 2.5, that means that a 1 per cent increase in the price will eventually result in a 2.5 per cent increase in the quantity supplied. If the elasticity of demand for a commodity is −0.6, that means that a 1 per cent increase in the price will eventually result in a 0.6 of 1 per cent *decrease* in the quantity demanded" (Kenneth E. Boulding, *Economic Analysis* [rev. ed., New York: Harper & Bros., 1948], pp. 128–29.)

Exhibit 3

A FIRM'S DEMAND CURVE
(Perfectly Elastic)

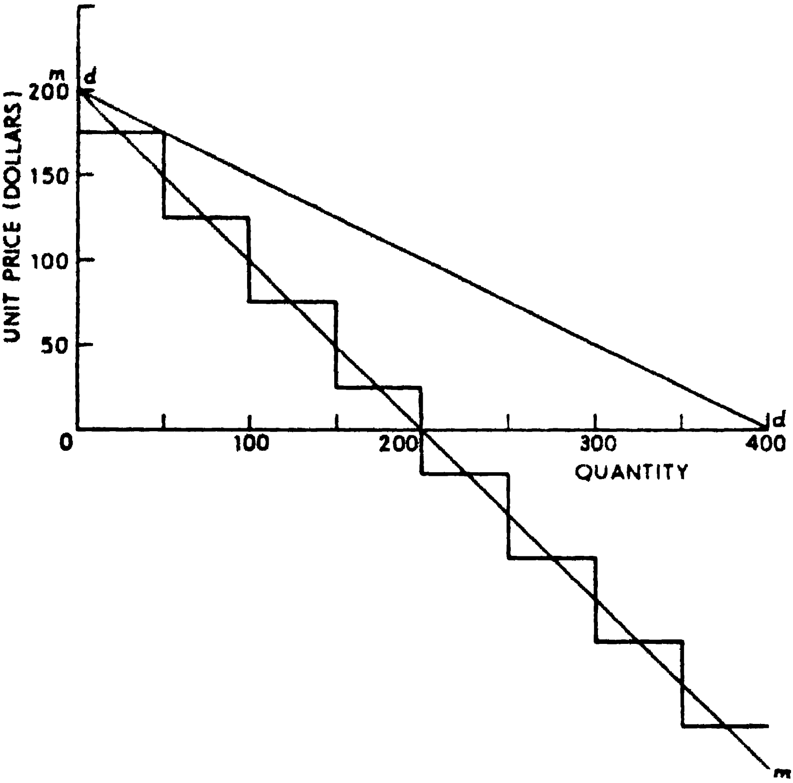


were his entire output thrown on the market, it would have an inappreciable influence on the market price. Knowing this, the wheat farmer simply adopts the market price as his own. The demand curve for the farmer is, for all practical purposes, perfectly elastic, as is graphically shown by the line *dd* in Exhibit 3. For similar reasons, firms in the lumber, bituminous coal mining, cotton textile, and women's clothing industries find their demand curves elastic.

Most business companies find that the amount they can sell at a given price is strictly limited and that they must reduce price in order to sell more (though the additional physical volume will not always mean larger dollar sales). This condition is shown by the line *dd* in Exhibit 4. In other words, many business firms in trade and manufacturing have demand curves which are less than perfectly elastic. This means that a firm must gauge carefully the level at

Exhibit 4

A FIRM'S DEMAND CURVE
(Less than Perfectly Elastic)



which it sets its price in relation to physical volume of sales. Price acts as a control valve, letting in an increased or decreased amount of dollar revenue.

In passing, it should be noted that the effects of a price change can be summarized in terms of the increase or decrease of total sales revenue resulting from the new price. This is called "marginal revenue." In strict logic, even a slight price change will result in an increase or decrease in the amount demanded. Theoretically, therefore, it is possible, by varying prices in minute amounts, to induce a continuous succession of marginal contributions to total revenue. There results a smooth curve of marginal revenue, such as is shown by line *mm* in Exhibit 4. Practically, businessmen are inclined to estimate marginal revenue in blocks of convenient size, such as 100 units, tons, or gross. The result is a steplike progression in the curve which shows the aggregate effect of successive increments of revenue; it is therefore a schedule of the businessman's estimates of "incremental revenue."

What determines the elasticity of demand for a product sold by a firm? Basically two things: (1) consumers' scales of preference and (2) the level and distribution of consumers' incomes. As the price of a product is reduced, consumers' preferences lead them to buy more of the product. Also, the lower price may attract customers from other companies selling similar products. There may, in addition, be a transference of demand to this product from goods made by other industries. These are the *substitution* effects of a price reduction. The willingness of consumers to buy a product, as its price declines, varies with different levels of aggregate consumer income. With some goods, higher levels of consumer income might mean less elastic demand; with other goods the situation might be the reverse. The distribution of consumer incomes also affects the amount demanded as price declines. As the company drops its price, other consumers, unable or unwilling to buy at the former price because of limited incomes, now come into the market and buy the product at the new low price. These are the *income* effects of a price reduction. In the case of a price increase, substitution and income effects work in the opposite manner from that just described.

Substitutes and Complementary Goods

Every businessman must be alert to the possibilities that a price reduction on his part may lead to a considerable increase in dollar sales through substitution of his product for his competitors' products. Likewise, a price reduction by competitors may rob him of sales volume by substituting their product for his. For that matter, where a company carries a number of lines, as in the case of a department store, internal substitution as a result of price reductions must be reckoned on.

But there is another possibility, namely, that, as the price of one product is reduced, sales of another product will not decline but increase. As an example of this complementary relationship, a sustained price reduction in gasoline increases sales of tires. Electric power and appliances afford another example of the economic bond in which a price reduction for one product favorably affects sales of the other.

Shifts in Demand

Although in economic theory market conditions are assumed to remain constant when the effect of a price change is being considered, in practical fact a businessman making sales estimates is greatly concerned about changes in market conditions. Many companies change prices only infrequently. They disregard short-term elasticities of demand. But changes in underlying market conditions occur almost daily. With shifts in national income, the capacity of consumers to buy the product changes. The tastes of consumers and the uses to which they put the product also change. Substitutes appear, and the prices of existing substitutes change relative to that of the product under consideration. The businessman, therefore, is forced to reappraise constantly these facts of the market which influence the sales of his product.

When one of the basic market factors, such as consumer income, has changed favorably, a company finds that it can sell more units of a product at the same price than formerly. Under these conditions it is also probably true that at lower prices (and even at higher) more units can now be sold than formerly. In other words, the entire system or schedule of demand has shifted. Graphically, as is shown in Exhibit 5, the demand curve has moved upward and to the right. There is, of course, no reason to assume that at all levels of price it has shifted the same distance to the right. With an opposite change in market factors, such as a decline in consumer income, the demand curve moves downward and to the left.[4]

The conditions causing shifts of demand for the product of a

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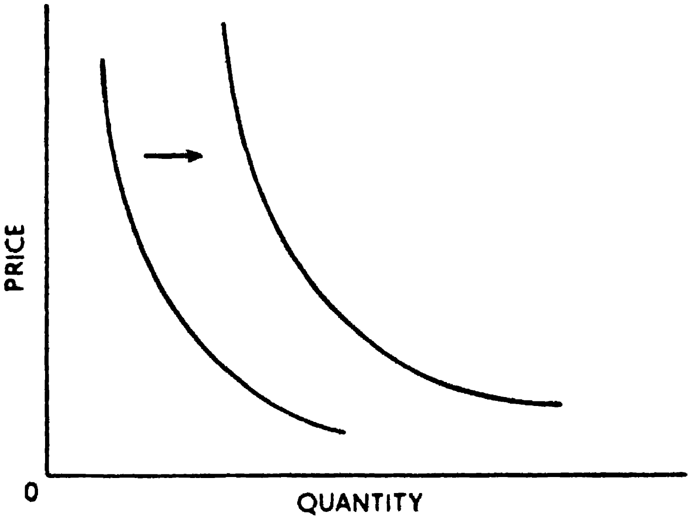
[3] An alternative way of describing these changes in demand is to distinguish between short term and long term elasticity. The demand curve previously described was "instantaneous," drawn on the assumption that market conditions remained unchanged. We can also draw a single curve which shows the results over time of changes in market conditions. The immediate effect of a price change on the amount demanded is usually less than the long run effect. A reduction in electric power rates, for example, may have little effect on usage in the month following the cut. Consumer habits remain unchanged. But, with lower power costs, consumers are induced to purchase more electric appliances. Homes are wired for electricity. Industrial users for whom power is an important cost expand operations, and new companies are established in the region. The long-term elasticity, therefore, is greater than that of the short-term. These effects, of course, would be modified in cases where the commodity can be stored and where buyers believe the future price will be higher. In such a case a price cut would reveal great elasticity of demand in the short run.

[4] For a further discussion of the effects of income changes on demand see p. 68.

Exhibit 5

SHIFT OF DEMAND



particular firm vary with the nature of the product and the structure of the market in which it is sold. Changes in consumer income are of direct importance for companies selling final or consumer goods. Not only changes in the total size of the national income in the hands of consumers but changes in its distribution among various spending units are important. Further, in estimating the sales potentials of national or regional markets, changes in the number and geographic distribution of consuming units must be taken into account. Changes in consumer tastes affect demand for a company's product, and to some extent advertising can influence these preferences. When substitutes appear on the market, a company may find the demand for its product declining because of a switch to the new products. Of course, the drawing power of a substitute is affected by its price in relation to that of the product for which it is substituted. Similarly, the development of new uses will have the favorable effect of increasing the demand for the firm's product. Much of what is called "product research" is devoted to the creation of new products (i.e., substitutes for old ones) and new uses for old products.

When a firm is selling to other business firms who use the product in their manufacturing operations (as raw materials, supplies, purchased parts, equipment, or plant) or who resell the product as a finished good, anticipation of changes in prices and profits is important. In this case the demand for the product is based on the demand for products of the buyer companies. It is, therefore, called a "derived demand." This term is used by economists principally where the relationship between first product and final good is fairly direct, as in the case of leather and shoes or crude oil and gasoline. It is true, of course, that all industrial goods are in the position of being in derived demand, though for many pieces of capital equipment the relationship is so indirect as to make it difficult to trace.

Another factor influencing the demand for goods, consumer and industrial alike, is changes in inventory. Businessmen must create stocks of goods in advance of manufacture and resale. But the size of these stocks, both absolutely and in relation to sales, can vary. With the prospect of increasing prices and sales, business buyers tend to build up inventories, thus increasing demand beyond the actual increase they have experienced in their own sales. With declining prices and sales, the opposite is true. Capital goods (plant and equipment) are peculiarly subject to these shifts in demand.

Timing of Shifts

Changes in demand sometimes follow more or less regular patterns over time. Some of these patterns recur annually and are called "seasonal variations" of demand because the intensity of demand for a product increases and decreases with the seasons of the year. A peak of sales at Christmas time in the department-store trade represents a positive seasonal shift of demand, just as slackening of sales after the first of the year represents a negative shift of demand.

In a less predictable manner the sales of certain goods increase and decrease with phases of the business cycle. The demand for consumer durable goods, such as domestic refrigerators and automobiles, shifts radically with the swings of the business cycle. Industrial goods are even more subject to *cyclical fluctuations* in demand.

Business companies engaged in the manufacture of rayon, chemicals, and drugs have experienced increases of demand in recent years which have persisted even in the face of declines in general business activity, and in good years the increases of demand have outstripped those for many other products. These are examples of a long-term or *secular* increase in the demand. The bituminous coal industry and the silk hosiery industry present instances of secular declines in demand. In many business companies shifts of this nature are the most important cause of changes in sales volume from one year to the next.

During World War II there was a sudden increase in the demand for many products. Mills producing cotton textiles, for example, found that the long secular decline in demand for their products was reversed and that war orders shifted their demand beyond the limits of effective capacity. With the end of hostilities and the satisfaction of immediate postwar civilian needs, demand again declined in intensity. These shifts are termed "erratic movements" because they follow no predictable pattern of recurrence or growth.

COMPETITION AMONG SELLERS

The foregoing section presented the formal conditions governing the elasticity of demand for a firm's product. It was stated that two basic factors are chiefly influential in determining demand: consumer income and substitution. It is yet to be explained how these factors operate in actual situations. Some business companies have highly elastic demand curves: a small change in price brings great changes in amount demanded. Other companies have somewhat inelastic demand curves for the products they sell. In the latter case the amount demanded is not greatly influenced by changes in price. What conditions explain *elastic* demand curves for some firms, *inelastic* for others?

A study of actual markets indicates that the following factors, among others, affect the elasticity of particular companies' demand curves: the number and size of sellers (and buyers), the nature of the product, the channels of distribution, the age of the industry, and the existence of patents, copyrights, and trade-marks. Although it is not possible to find any relationship so precise as statistical correlation between these factors and the elasticity of a given firm's demand curve, there is much factual evidence to indicate the causal link between these market conditions and elasticity of demand. In this section we shall consider the effect of numbers and size of sellers on the elasticity of a firm's demand curve. Subsequent sections examine other factors influencing elasticity of demand.

Number of Firms in Industry

Broadly, the proposition that a large number of sellers promotes elasticity of demand for the individual seller, while a small number encourages inelasticity, is accurate. But the proposition requires some refinement to be useful. In the case of the 1,364,000 wheat farmers, cited above, demand for the individual firm (i.e., the wheat farmer) is perfectly elastic. No one farmer's action can influence the market price, which he therefore takes as given. At the other extreme, in the case of a single-firm monopoly, such as DeBeers Consolidated Mines, Ltd. (the South African diamond trust), demand is inelastic within certain price ranges. A survey of American industry shows that most actual market structures fall between these extremes.[5] The interest of businessmen and economists frequently centers on situations such as those in the steel, automobile, and chemical industries, where the small number of producers and the large size of some units affect demand. Unlike the wheat farmer, each firm in these industries produces such a large part of the total output that a price cut affects the amount which it can sell, the firm does not have a completely elastic demand curve. And, like the diamond monopoly, each firm in these industries is aware that its own actions affect its competitors. A price cut is likely to invite retaliation; a firm cannot ordinarily expand its share of the market (for any long period of time) by price reductions. The *effective* elasticity of its demand curve (considering the reactions of competitors) is less than the elasticity it *might* experience if other firms were unaffected by its action.

In actual business situations there is no certainty that each one of a small number of producers in an industry will act with careful regard for the reactions of others. Although in the rubber tire industry, four firms in 1937 accounted for 80 per cent of total output, producers have frequently acted more with regard for the immediate advantages of a price cut than with regard for reactions of competitors. On the other hand, firms in industries where numbers are larger sometimes act with careful calculation of competitors' reactions. The logical (but illegal) outcome of this course of action is the cartel, in which firms agree not to compete in matters of price, terms, and other conditions of sale.

Size of Firms

Just as the number of firms alone offers no sure measure of the elasticity of demand for the individual company, so also the size of firms affords no precise indication of elasticity. In some industries, such as steel, certain producers are so clearly dominant that reactions of smaller producers are well disciplined. In these industries smaller producers are well aware of the probable consequences if they were to trust in the *potential* elasticity of demand based on unilateral price reduction. In industries where the dominance of one or a few producers is not clearly established, the haziness of the competitive atmosphere may lead smaller producers to believe that minor price cuts will not induce retaliation. The demand curve for such a firm possesses a high degree of elasticity.

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[5] Clair Wilcox, *Competition and Monopoly in American Industry* (*T.N.E.C. Monograph* No. 21) (Washington, D.C.: Government Printing Office, 1940).

In any case, the effective elasticity of demand is not to be determined completely by the numbers or size of competitors in an industry. Other factors affecting market relations, such as the nature of the product, channels of distribution, etc., exert a powerful influence in determining the net elasticity of demand.

NATURE OF THE PRODUCT AND CHANNELS OF DISTRIBUTION

In the foregoing section it was stated that market relations among business companies determine the elasticity of demand. Two aspects of market relations are considered in this section: those which arise out of the nature of the product and those which come from the character of the channels of distribution.

Differentiation of Product

Many companies which are commonly regarded as members of the same industry make and sell products which are not identical. The basis for this differentiation of one company's product from another's may rest in some distinctive characteristic, such as design, trade-name, or patented feature. Campbell's soup, Pepsodent tooth paste, Lucky Strike cigarettes—these and countless other differentiated products are among the most familiar features of our daily lives. Similarly, the service product of a retail store is distinguished from that of other stores by a complex differentiation, such as store location, customer services, and even the smile of the proprietor. Differentiation of products can be created and accentuated by advertising and other devices of sales promotion. As a result, groups of consumers attach themselves more or less firmly to companies whose products they prefer.

What is the effect of differentiation on demand? It is at once evident that consumer preferences for the products of particular companies influence the prices they will pay for these products. A higher price will not cause all consumers to desert the product. Indeed, in some cases differentiation has so firmly established customer preference that a *much* higher price has little effect in reducing the amount demanded. On the other hand, there are those who prefer other products or who are repelled by the differentiation of a particular company's product. For this class of consumers a price reduction below the general level of competing products may have little effect in attracting them to buy the product in question. The net effect is that substitution between this product and other products has been somewhat cut down. In the language of economists, the seller of a differentiated product is a "quasi-monopolist." The elasticity of demand for his product is less than that for a perfectly substitutable (standardized) product. His demand curve, instead of being horizontal, as in the case of the wheat farmer, is somewhat sloped, less being demanded at high prices and more at lower prices (see Exhibit 4, p. 58).

Other Product Characteristics Influencing Demand

The market demand for luxuries, taken as a class, has usually been represented as more elastic than the demand for necessities. This brings up the subjective classification of what is a luxury and what is a necessity. Clearly, income has an important effect on how consumers classify their wants. Citrus fruit, for a very low-income family, may be a luxury, for a family of middle income it may be classified as a necessity. The matter of taste also enters. However, there are some products so clearly in the luxury class for most consumers, such as caviar and champagne, that price is likely to make a difference in the amount demanded. Similarly, there are other products, such as milk for infants, which are so generally considered necessities that the demand is inelastic. It is important to recognize that in this discussion we have been speaking of *market* demand for the product, as influenced by its luxury or necessity character. The elasticity of the individual firm's demand curve may not be directly related to the elasticity of the market curve. That depends on other aspects of market structure, such as the number of competing firms, differentiation of product, etc.

Another product characteristic bearing on the nature of demand is durability. With the increasing cumulation of capital in the economy, in the hands both of producers and of consumers, the rate at which new goods are taken off the market depends on the existing stock of goods now in user hands. Where the useful life of existing consumer and producer capital goods can be extended over many years, additions and replacements can fall to a very low level if income and revenue prospects are not sustained. The development of durable capital goods, with the accompanying feature of extensibility of life, places great importance on the *expectations* of businessmen and consumers. At the same time this characteristic of durability of capital goods—whether producers' or consumers'—creates a volatile situation in the economy where demand can shift radically in a short space of time.

Related to durability is the distinction between consumers' and producers' goods. In general, producers' goods are more durable than consumers'; and this creates a greater potential in industrial markets for drastic shifts of demand. There is a further distinction, however. Businessmen purchase producers' goods for use in further production. When business is expanding, entrepreneurial calculations necessarily run in advance and beyond the results currently appearing in consumer markets. The heavy machinery and plant of a steel rolling mill must be purchased years in advance of the satisfaction of demand for the automobile which is made from sheet steel. The demand for machinery, therefore, rises more rapidly and also declines more abruptly than does the demand for consumer goods made with the machinery. In a word, the demand for producer goods is more sensitive than the demand for consumer goods. Related to this fundamental characteristic of capitalistic production is the role of inventories. The size of these also is based on expectations for demand. In general, as the expected future rate of sale increases, inventories mount, but at a faster rate. Inventories of raw materials and industrial supplies are frequently more volatile than inventories of consumer goods.

Channels of Distribution

Closely related to the product itself are the channels through which it is distributed. Where these involve a succession of independent middlemen, each of whom must assess a margin against the price of the product, demand is likely to be less elastic than when the product passes to the consumer through shorter channels.

Margins are somewhat conventionally determined and are frequently inflexible as a percentage of wholesale cost to the merchant. This is probably one reason why retail prices in general are less flexible than wholesale prices. The attempt to preserve margins is found in numerous lines where prices are maintained under so-called "fair trade" laws.

CHANGES IN CONSUMER INCOME

Businessmen and economists have for many years been aware of the important effect of changes in the price of a commodity or service on the amount which could be sold. It was this relation between price and amount demanded which led economists to formulate the demand curve of economic theory, which is essentially a schedule of price-quantity relationships. With the concept of the demand curve, it became possible to speak of "elasticity of demand," meaning the relative effect of a price change on the amount demanded. Since the quantity demanded varies with the price at which the product is offered, this relationship is called "price elasticity of demand."

Price elasticity of demand is a static concept. It assumes that there is no change in the basic conditions of the market. Now it is quite clear that in the actual markets with which businessmen are concerned conditions seldom or never remain the same. Most of the important facts on which a businessman bases his estimates of demand relate to changes in market conditions. For this reason company executives are usually more concerned about the effect of market changes which cause shifts of demand than they are about the influence of changes in their own prices on the amount sold.

Among the changes which can take place in markets, none is more important than increases and decreases of consumer incomes. Although, over a period of years, the uses of the product can change, substitutes can be developed, prices of competing goods can shift, and other conditions affecting demand can change, variation in consumer incomes is, for many classes of products, the most important determinant of the amount demanded. The relationship between changes in income and changes in the amount demanded can be formalized in the concept called "income elasticity of demand." Just as price elasticity indicates the effect of variations in price on the amount demanded, so income elasticity shows the effect of variations in consumer income on the amount demanded.

Changes in consumer income directly and indirectly affect the demand for all types of products. Changes in income indirectly affect the demand of business buyers at different levels in the manufacturing and marketing processes. At the final retail level for consumer goods, however, income changes exert a direct effect on demand. Here changes in the volume of retail sales are influenced chiefly by changes in the level of consumer incomes. This is because the dollars in the hands of consumers are a direct money demand *for the finished goods which money can buy. The expenditures of consumers can be directly related to their incomes. Of course, the effects of a change in the level of consumer incomes* will be different for different lines of retail trade. Durable goods respond in one way, nondurables in another; jewelry sales have a different relationship to changes in consumer income than do sales of automobile tires.

FORECASTING DEMAND

Businessmen employ numerous methods of forecasting demand. Often the forecast is little more than a shrewd guess, which has little claim to scientific precision. For the most part these forecasts do not attempt to relate price changes to variations in the amount of a particular product which can be sold. These forecasts, therefore, are not statistical schedules of price elasticity of demand. Usually the estimates of sales relate to groups of products or the entire output of the firm rather than to individual products. Frequently, also, the estimates are projected on the assumption that prices of the products remain constant. Under these conditions, attention is directed to other variables which influence sales volume.[6]

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[6] Lack of interest, on the part of businessmen, in the effect of price changes on volume of sales has been attributed to the general belief that industry demand is inelastic. Thus price makes little difference in sales, if competitors match one another's prices. The preponderant effects of advertising, changes in national income, and product modification also obscure the influence of price changes in many markets. In industries where prices have remained unchanged over long periods, lack of experience with the effects of price changes leads businessmen to undervalue this factor. Several methods are available, however, for estimating the effect of price on quantity sold: (1) controlled experiments, (2) correlation analysis of historical records, (3) examination of price experiences, (4) prospect questionnaires, (5) guesses of experienced observers, and (6) engineering estimates. Of these methods, the controlled experiment holds the greatest promise. This consists in varying the prices charged and noting the effect on number of units sold and, at the same time, holding constant other conditions which affect sales volume. Several forms of con-

The selection of significant variables causally related to changes in the volume of sales is the heart of the problem of sales forecasting. These variables indicating demand for the firm's products may be selected from a wide range of relationships. A manufacturer of plumbing supplies may look to the volume of construction awards to forecast sales. Railroads may follow crop reports and industrial production data to forecast volume of freight traffic. For many purposes, forecasts of consumer income are a valuable basis for estimating sales. When these data are used, the sales forecast is basically a determination of the income elasticity of demand for the products in question. Proposed capital expenditures, estimates prepared quarterly by the United States Department of Commerce, are an important basis of sales forecasting in many industries.

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trolled experiment can be used, such as charging different prices in different localities, varying prices in the same market while endeavoring to control other conditions, and manipulating the spread between a branded product and a private or unknown brand. In one case a mail-order house experimented with price by sending out a million catalogues containing a price of $1.98 for a certain item, a second million with a price of $1.98, and others with prices down to $1.88 (Joel Dean, "Pricing Policies and Cost Analysis," *Proceedings of the National Association of Cost Accountants, Palmer House, Chicago, Ill., June 19–22, 1949*).

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Elasticity and Shifts of Demand

Case II-1: NEW YORK, NEW HAVEN, AND HARTFORD RAILROAD (A)

The management of the New Haven Railroad anticipated that, with the opening of the World's Fair in New York in April, 1939, the railroad would be unable to handle the probable volume of travel at existing rates. It was believed that the greatest pressure would arise as a result of the low Sunday excursion rates, which were calculated at about one cent a mile. Excursion rates usually drew peak traffic in summertime. The railroad therefore raised these rates for travel into, but not out of, New York. The higher fares went into effect on April 30 and continued to August 6, 1939.

Exhibit 1

EXCURSION FARES AND TRAFFIC TO NEW YORK CITY, NEW HAVEN RAILROAD, 1939

Origin	Excursion Round-Trip Fare	Special Excursion Fare April 30–August 6, 1939	Number of Passengers		
			Av. Sunday, Month before April 30, 1939	Av. Sunday, April 30–August 6, 1939	Av. Sunday, 3 Months after August 6, 1939
Bridgeport	$1.25	$1.50	401	312	506
New Haven	1.50	1.95	560	401	915
Providence	3.50	4.75	75	30	150
Boston	3.50	5.85	502	114	891

Source: William J. Dixon, *The Elasticity of Demand for Railroad Passenger Transportation* (New Haven, Yale University, 1941. Mimeographed.

Questions

1. Was the demand for excursion travel on the New Haven Railroad elastic or inelastic? On what assumptions do you base your answer?
2. Is it probable that excursion travel is more sensitive to rate changes than regular travel? Why?

3. What does the volume of travel after August 6 indicate about the nature of demand?

Case II-2: LINCOLN CITY LINES, INC.

On May 8, 1947, the Lincoln City Lines, Inc., a corporation operating passenger buses in the city of Lincoln, Nebraska, filed an application with the Nebraska State Railway Commission for an increase in fares. The company contended that, because of increases in costs of labor, equipment, and other elements of operation, the 5-cent fare failed to yield sufficient revenue to cover operating expenses, including taxes, and to provide a proper reserve for replacements or to permit it to receive a fair return upon the value of the property used in its business. The company also contended that the revenues which it received were inadequate to cover extension of its operations into new areas and improvements in service in accordance with current public demand.

The Lincoln City Lines was formed by the merger of several corporations which had originally rendered street railway service in the city of Lincoln. In 1943 all the company's capital stock, bonds, and notes outstanding were acquired by the National City Lines, Inc., of Chicago. The National City Lines was a holding company which operated subsidiary transportation lines in many large and medium-sized cities over the country. Whenever practicable, it was the policy of the National City Lines to convert the street railway equipment of its subsidiaries to motor bus equipment. In the case of the Lincoln City Lines this conversion from street cars to buses was completed by September 1, 1945.

Shortly after its acquisition by National City Lines, the Lincoln City Lines, with authority granted to it by the Nebraska State Railway Commission, voluntarily placed in effect a reduced schedule of fares which provided for a basic 5-cent rate. This 5-cent fare was not requested or adjusted as a result of a revaluation of the property or a determination of fair return on investment or the employment of any other of the usual factors in rate making.

During the war the population of Lincoln had increased an estimated 18 per cent over the 1940 Census figure of 81,984. Much of this increase had come from industrial workers attracted to the city by the growth of war plants. With the reduction in war contracts, many of these workers returned to their homes in other regions, causing a decline in the city's population. As a result, the number of passengers carried by the Lincoln City Lines declined from 13,470,198 in 1945 to 11,673,695 in 1946. Revenues decreased from $686,524.10 to $595,451.24.[1]

Of the total number of revenue passengers, the company estimated that 72 per cent were workers in industrial companies and business firms who were accustomed to ride to and from work by public transportation. Peak loads, which accounted for 60 per cent of the total revenue, came between 6:00 A.M. and 8:30 A.M. and between 3:30 P.M. and 5:45 P.M. The sharpest peak was reached during the latter period, at which time all available equipment was used. In the off-peak periods 48–51 per cent of the operating equipment was used. Saturday traffic usually equaled traffic on the other weekdays, but the flow was smooth and regular without marked peaks. Sundays and holidays resulted in a reduction of traffic to less than half the normal weekday volume.

Distances from their homes to places of employment prevented most industrial workers in the city of Lincoln from walking to work, although in the spring and autumn months there was a perceptible increase in the numbers who walked. For similar reasons the riding of bicycles, which had increased under the pressure of wartime gasoline shortages, was not an important means of transportation. Taxi fares in Lincoln were 25 cents for the first half-mile and 10 cents for each additional quarter-mile. There were no additional charges for more than one passenger. At rush hours taxis were frequently unavailable, especially outside the main shopping district. By city ordinance taxis were forbidden to solicit rides on routes covered by public transportation.

Ownership of private automobiles in Lincoln was well above the national average, but a consumer survey showed that automobile ownership dropped from 70.9 per cent in 1945 to 63.2 per cent in 1946. This was attributed to higher initial costs of purchasing new automobiles and to higher operating costs. In the central shopping district, parking-lot fees ranged from 35 to 60 cents per day, although monthly rates of $6.00 to $10.00 were offered regular patrons. In the wholesale and industrial districts parking fees were lower, and companies frequently provided parking space for their employees' cars.

In addition to traffic derived from passengers going to and from work, there was a substantial volume of revenue traffic from women shoppers, who customarily traveled to and from downtown shopping districts in off-peak hours. During and after the war, growth of suburban shopping centers had reduced the numbers of shoppers going to the central shopping district. The Lincoln City Lines had studied the advisability of encouraging this off-peak travel by reduced rates, but up to May, 1947, when the general rate increase was requested, no definite steps had been taken.

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[1] These totals include small amounts of nonpassenger revenue, such as that from chartering and advertising.

The proposed rate increases submitted to the railway commission in May, 1947, called for a regular cash fare of 10 cents or, alternatively, the payment of a token, which was to be sold at the rate of three for 25 cents. Children between the ages of five and twelve years were to ride at the cash fare of 5 cents. Children under five years of age, when accompanied by a revenue passenger, would be carried free. A forecast of the proportion of passengers that would ride at the various rates proposed by the company indicated the following division of traffic:

Rate	*Percentage of Total Traffic*
10-cent cash fare	7.00
5-cent cash fare	3.03
8⅓-cent fare (tokens three for 25 cents	89.97
	100.00

The company anticipated a decrease in traffic for the year 1947 as a result of the decline in population and in industrial production. If the requested rate increase were granted, the company believed the combined effect of all factors, including the rate increase, would reduce the annual number of revenue passengers to 9,826,956.

QUESTIONS

1. Was it advisable for the Lincoln City Lines to apply for a rate increase in May, 1947?
2. Would the proposed increase affect all classes of traffic equally?
3. Would it be desirable to offer lower rates to some classes of traffic? On what grounds is it justifiable to have lower rates for children?
4. In the absence of state regulation of rates, what prices would an intelligent street railway management set?

Case II-3: AMERICAN MARKETING ASSOCIATION

In the fall of 1946 the directors of the American Marketing Association decided that more revenue was needed for meeting current operating expenses of the association, and they were considering, therefore, raising membership dues from $5.00 to $10.00 per annum. On November 1, 1946, the president and directors polled the membership as to the desirability of increasing the dues. Along with the ballot, which was mailed to each member, was sent an explanatory letter setting forth the need for increased revenues. This letter noted that there had been a marked rise in the number of members belonging to the association (Exhibit 1) and that the work of the secretary's office had grown to such an extent that it now seemed desirable to increase the amount of paid secretarial help.

Exhibit 1

MEMBERSHIP IN AMERICAN MARKETING ASSOCIATION, 1937–48

Year	*No. of Members End of Year*	*Year*	*No. of Members End of Year*
1937	581	1943	1,288
1938	*	1944	1,650
1939	*	1945	1,875
1940	*	1946	2,539
1941	1,041	1947	2,950
1942	1,051	1948	3,003†

* No record

† April 15, 1948

Source: Records of secretary of American Marketing Association

The letter also pointed out that, with the increased membership and the establishment of sixteen chapters of the association throughout the United States, it was necessary to provide a travel budget so that the officers of the association could keep in closer touch with the membership. The directors also believed that it was desirable to establish a monthly bulletin to be sent to all members. In the years following the war, printing costs had risen, and these, together with the expanded membership rolls, had led to greater expense in sending out periodic letters to the membership. With the increase in membership, distribution costs for the *Journal of Marketing*, the official periodical, had also risen. The directors, furthermore, proposed that the roster of membership, which had hitherto been sold to members for $1.00 a copy, be sent at no additional charge to each member.

On January 9, 1947, the secretary of the association announced that the membership, by a vote of 736 to 150, had ratified the increase in dues. The association immediately adopted an expanded budget for the year 1947 which reflected the conditions noted in the officers' letter of November 1, 1946. The increase in income and expenditures for 1947 over 1946 is shown in Exhibit 2.

Exhibit 2

AMERICAN MARKETING ASSOCIATION

COMPARATIVE STATEMENT OF INCOME AND EXPENSE FOR THE TWO YEARS ENDING DECEMBER 31, 1946 and 1947, RESPECTIVELY

INCOME AND EXPENSE		YEAR ENDED DECEMBER 31		INCREASE
		1946	1947	
Income:				
Dues:				
Current year		$ 9,653.25	$22,686.75	$13,033.50
Prior years		32.50	12.25	20.25*
In advance		1,539.25	3,026.75	1,487.50
Total	(1)	$11,225.00	$25,725.75	$14,500.75
Roster:				
Current year		1,605.00	279.00	1,326.00*
Prior years		2.00	32.00	30.00
In advance		4.00	10.00	6.00
Total	(2)	$ 1,611.00	$ 321.00	$ 1,290.00*
Miscellaneous	(3)	$ 124.00	$ 192.24	$ 68.24
Total Income	(1) (2) (3)	$12,960.00	$26,238.99	$13,278.99
Expenses:				
Journal of Marketing		$ 2,470.00	$ 3,540.25	$ 1,070.25
Clerical		2,382.05	5,613.59	3,231.54
Telephone and telegraph		200.28	560.24	359.96
Printing		1,861.16	3,249.31	1,388.15
Roster expense		1,903.11	3,201.72	1,298.61
Committee expense		656.79	692.82	36.03
Postage		563.15	709.57	146.42
Travel		466.62	2,625.41	2,158.79
Office supplies		220.81	1,386.17	1,165.36
Conference expense		332.14	1,235.58	903.44
Monthly *Bulletin*		166.09	2,293.89	2,127.80
Social security tax		45.37	37.40	7.97*
Moving secretary's office		224.33		224.33*
News letter			55.66	55.66
Miscellaneous		93.88	460.13	366.25
Total Expense		$11,585.78	$25,661.74	$14,075.96
Excess of Income over Expense		$ 1,374.22	$ 577.25	$ 796.97*

* Decrease.
Source: *Monthly Bulletin* of the American Marketing Association, February, 1948.

The American Marketing Association was formed in 1936 by a merger of the American Marketing Society, which had been established in 1931, and the National Association of Marketing Teachers, founded in 1915. The major purposes of the American Marketing Association were stated in the constitution as follows:

1. To foster scientific study and research in the field of marketing
2. To develop sound thinking in marketing theory and more exact knowledge and definition of marketing principles
3. To improve the methods and technique of marketing research
4. To contribute to the improvement of the teaching of marketing
5. To develop better public understanding and appreciation of marketing problems
6. To study and discuss legislation and judicial decisions regarding marketing
7. To improve marketing personnel and study personnel problems
8. To record progress in marketing through the publication of a journal
9. To encourage and uphold sound, honest practices and to keep marketing work on a high ethical plane

National meetings were held twice a year in December and in May or June. The association, after the merger of the two parent organizations, also established a new publication, the *Journal of Marketing*, which first appeared in July, 1936. The new publication superseded the *American Marketing Journal*, which had been published by the American Marketing Society, and the *National Marketing Review*, which had been published by the National Association of Marketing Teachers. The *Journal of Marketing* appeared quarterly and was distributed without additional fee to the entire membership.

The membership of the American Marketing Association was composed of individuals in three occupational groups: members employed by business firms and trade-associations; teachers of marketing and related subjects in universities and colleges; and government officials. The respective percentages in each of these groups represented in the total membership in January, 1947, are shown as follows:

	Per Cent
Teaching	18.5
Government	2.5
Business (including trade-associations)	79.0
	100.0

Even in July, 1936, at the time of the merger of the two parent organizations, members who were employed by business companies outnumbered university teachers and government officials. The increase in membership from 1937 to 1948 (shown in Exhibit 1) was to a great extent from commercial rather than academic sources.

The *Journal of Marketing* contained articles from members of all classes, but particularly from the university group. All except one editor-in-chief of the journal in the eleven years of its existence had been university faculty members. It was generally believed that the university members considered the journal more important to their professional activities than did the business members.

Most of the members belonged to other professional organizations as well as to the Marketing Association. Some of these organizations had advanced their dues during the period after the war while others had not. These changes are shown in Exhibit 3.

Exhibit 3

DUES OF PROFESSIONAL SOCIETIES, 1940, 1947

	Dues	
Society	1940	1947
American Accounting Association	$ 5.00	$ 5.00
American Association of University Professors	4.00	4.00
American Economic Association	5.00	5.00
American Farm Economic Association	5.00	5.00
American Finance Association	3.00	5.00
American Institute of Accountants	25.00	30.00
American Statistical Association	5.00	8.00
Economic History Association	3.00	3.00

Prior to the war, dinner meetings at conventions of the American Marketing Association were customarily priced at $2.00 or $3.00. In the period after the war, prices for dinner meetings were set as follows:

Boston, May, 1946	$4.00
New York, June, 1947	$8.00
Chicago, December, 1947	$4.00

In the letter to the membership on November 1, 1947, regarding the advance in dues, the officers pointed out that the total cost of active participation in the Marketing Association was much greater for each member than the dues themselves:

> To place the matter in proper perspective, it must be generally conceded that A.M.A. dues have been—and will continue to be—a relatively small part of the cost of active participation in the affairs of the Association. One who gets full measure of benefit from his membership, who regularly attends local and national meetings and who contributes time and talent to committee work, will expend many times the amount of the annual dues which sustain his membership in the course of such activity.

Many business companies encouraged their executives to join the Marketing Association. It was customary for these companies to pay annual dues for their employee members as well as traveling and other convention expenses for association meetings. Many companies also followed the practice of paying for weekly luncheons of local chapters which employee members attended. Universities, on the other hand, ordinarily did not pay for any membership expenses of their faculty except where their staff members were presenting papers at a convention. It was then the custom to pay for transportation and sometimes hotel expenses. Weekly luncheons were seldom paid for by the universities.

After the dues had been advanced from $5.00 to $10.00, total revenue increased from $11,225 in 1946 to $25,725 in 1947.

QUESTIONS

1. Was the demand for membership in the American Marketing Association elastic or inelastic? On what assumptions do you base your answer?
2. What was the probable difference in elasticity of demand on the part of university members as compared with business members?
3. What economic factors accounted for the increase in revenue of the American Marketing Association after the increase in dues from $5.00 to $10.00?

Case II-4: NEW YORK, NEW HAVEN, AND HARTFORD RAILROAD (II)

Prior to June 1, 1936, the basic passenger fare for railroad travel in the eastern United States was 3.6 cents per mile. For Pullman travel there was a surcharge above this basic rate. On June 1, 1936, by order of the Interstate Commerce Commission, the basic rate was lowered to 2.0 cents per mile for coach travel. The Pullman rate was reduced to 3.0 cents per mile, and the surcharge was abolished. These fares continued in effect until July 25, 1938, when the Interstate Commerce Commission authorized an increase in the coach rate to 2.5 cents per mile. The Pullman rate remained at 3.0 cents per mile. On March 25, 1940, the commission restored the basic rate of 2.0 cents for coach travel.

It was generally believed by officials of the Interstate Commerce Commission that a reduction of railroad passenger rates would, under many conditions, serve to increase total revenues. This view was not shared by officers of the New Haven Railroad.[1] A study of the demand for passenger travel on the New Haven by Mr. William

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[1] For statements of views of the commission and of the management of the New Haven Railroad see *Interstate Commerce Commission Reports*, Vol. CCXIV, No. 26550, "Passenger Fares and Surcharges" (February 28, 1936), pp. 174 ff. The opinion of Commissioner Meyer is reproduced at the end of this case.

J. Dixon of Yale University threw some light on this problem. The Dixon study was confined to one part of the New Haven system, the heavily traveled Shore Line running from New York to Boston through the cities of Bridgeport, New Haven, New London, and Providence.[2]

Exhibit 1

OPERATING REVENUES OF THE NEW HAVEN RAILROAD, 1935–40

Years	Freight	Passenger	Other	Total	Net Railway Operating Income
1935	$40,834,001	$22,108,806	$8,170,473	$71,113,280	$8,179,548
1936	44,880,649	24,996,101	8,990,399	78,867,149	8,036,300
1937	45,150,055	26,892,165	9,100,367	81,142,587	1,591,390
1938	38,809,938	26,329,579	7,940,624	73,080,141	517,047
1939	47,525,678	27,381,782	8,511,016	83,418,476	8,462,922
1940	50,512,702	26,342,490	8,748,917	85,604,109	9,274,354

Source: Moody's *Manual of Investments: Railroad Securities.*

Exhibit 2

AVERAGE FARES AND PASSENGER TRAFFIC ON THE NEW HAVEN RAILROAD, 1935–40

Years	Average Rate per Passenger per Mile (Cents)	Passengers Carried	Passenger Miles	Average Miles per Passenger
1935	2.13	30,920,975	1,036,305,605	33.51
1936	1.97	34,551,901	1,268,606,403	36.72
1937	1.87	37,188,689	1,438,562,921	38.68
1938	1.92	37,705,865	1,371,825,001	36.38
1939	1.99	36,197,090	1,373,887,509	37.96
1940	1.83	36,713,912	1,437,481,656	39.15

Source: Moody's *Manual of Investments: Railroad Securities.*

The Shore Line of the New Haven Railroad traversed the heavily industrialized sections of southern Connecticut, bordering Long Island Sound, and the populous manufacturing areas of Rhode Island and eastern Massachusetts. In the period 1935–40 this region experienced little change in population, the six principal cities on the route of the New Haven having the following populations in 1940:

New London	48,000	Providence	444,000
Bridgeport	170,000	Boston	1,570,000
New Haven	230,000	New York	7,455,000

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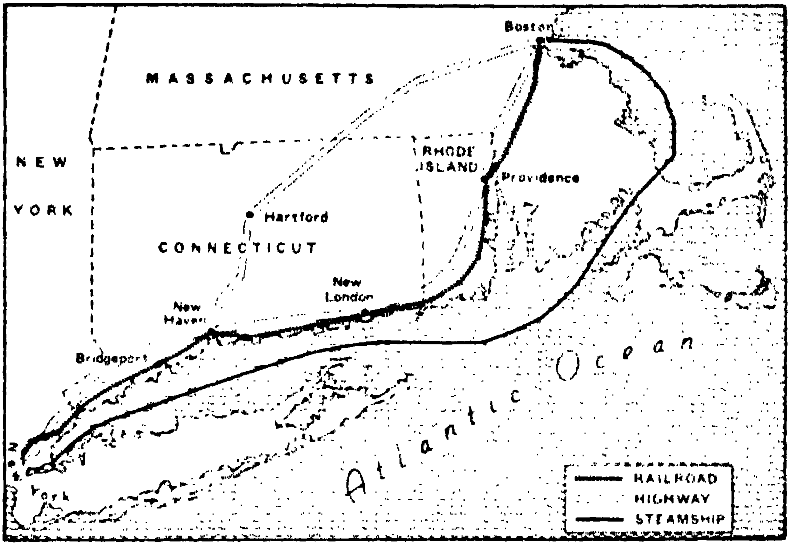
[2] Many of the facts contained in the present case are derived from Mr. Dixon's essay, *The Elasticity of Demand for Railroad Passenger Transportation* (New Haven: Yale University, 1941). Mimeographed.

Exhibit 3

MAP OF THE SHORE LINE OF THE NEW HAVEN RAILROAD*



* Adapted by permission of Moody's Investors' Service

These cities provided the New Haven Railroad with a high density of traffic, amounting to 2,742,293 local passengers, or 325,546,000 passenger miles in 1940.

In order to determine the effect of rate changes on volume of traffic, the survey covered only local traffic, that is, the traffic which originated in the six principal cities of the Shore Line and which had as destinations some one of these cities. Interline and commuting traffic were excluded. Ticket-sales data were collected from station accounts by months for the years 1935–40 inclusive.

The New Haven offered four types of passenger service: regular coach, regular Pullman, limited Pullman, and excursion. Regular-fare traffic, both coach and Pullman, accounted for the largest part of total passenger revenue. For this reason it was decided to study the relationship of the volume of this traffic to rate changes. For purposes of this study the weighted averages of regular coach and regular Pullman fares were determined by giving effect to the number of passenger miles actually recorded for each type of traffic. The result was a weighted average fare actually moving traffic in each period.

Although, as noted above, there were three primary rate changes in the period 1935–40, from time to time minor changes of rate were introduced by the railroad. Prior to the Interstate Commerce Commission ruling of June 1, 1936, there was a 3.0-cent rate for thirty-day round trip and summer travel and a 2.5-cent rate for week-end trips, both valid in coaches and Pullman cars. Between Providence and Boston, the 2.5-cent rate also prevailed in five-trip form, and on June 5, 1935, a one-day round trip ticket was established between these two points computed at approximately 2.0 cents a mile. When the New York World's Fair opened on April 30, 1939, the New Haven introduced sixty-day round-trip coach tickets at 2.25 cents per mile. These were at first good only for trips into New York, but two months later they were placed on a system-wide basis. During the Christmas season in both 1938 and 1939, special round-trip coach tickets with limited return were sold for 2.0 cents a mile. During the entire period, Sunday and holiday popular excursion tickets between certain points, priced at approximately 1.0 cent a mile, were on sale, as well as some special two-day excursion tickets at somewhat higher rates. Except for the excursion rates, all of these minor fare changes, as well as the three primary changes of June 1, 1936, July 25, 1938, and March 25, 1940, were included in the weighted average fares for regular traffic.

For each of the years 1935–40, weighted average fares of regular traffic were computed for the winter months—January, February, and March—for the summer months—June, July, and August—and for the entire year. These several average fares were then placed against the respective traffic volumes for each of the years under study, as shown by Exhibit 4. Graphic presentation of these data in Exhibit 5 reveals the existence of an unmistakable relationship between fares, traffic, and revenue. A fare reduction of 33⅓ per cent, for example, from 3.0 to 2.0 cents per mile, was, on the average, associated with the following percentage increases in passenger miles and revenue:

	Winter Months	*Summer Months*	*Annual*
Passenger miles	87	117	103
Revenue	24	45	35

The survey noted that, on the graph for the summer months, the observation for 1936 was below the curve of relationship because there is a time lag of about two months after a fare change before traffic reaches the level it would ordinarily have at that fare. As

Exhibit 4

AVERAGE FARES, PASSENGER MILES, AND REVENUES FOR LOCAL TRAFFIC ON SHORE LINE OF NEW HAVEN RAILROAD, 1935–40

Year	Winter January, February, March			Summer June, July, August			Entire Year		
	Fare (Cents per Mile)	Passenger Miles (Millions)	Revenue (Million $)	Fare	Passenger Miles (Millions)	Revenue (Million $)	Fare	Passenger Miles (Millions)	Revenue (Million $)
1935	2.75	48	1.32	3.10	38	1.18	3.10	180	5.58
1936	2.95	56	1.65	2.25	70	1.58	2.45	275	6.74
1937	2.25	84	1.89	2.20	82	1.80	2.25	345	7.76
1938	2.25	83	1.87	2.35	69	1.62	2.35	315	7.40
1939	2.65	70	1.86	2.50	74	1.85	2.55	310	7.90
1940	2.50	73	1.83	2.20	81	1.78	2.25	330	7.43

Source: William J. Dixon, *Elasticity of Demand for Railroad Passenger Transportation* (New Haven: Yale University, 1941), p. 21.

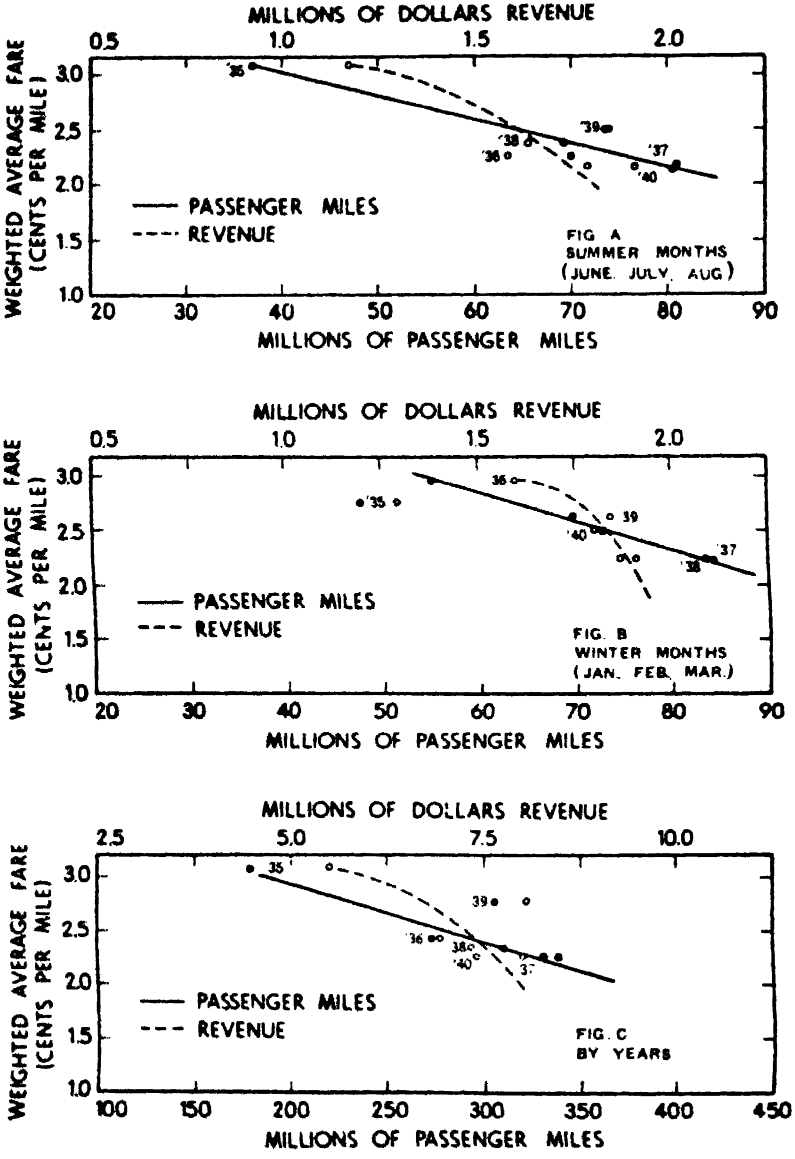
fares were lowered on June 1, 1936, two of the three summer months were experiencing this lag. Both 1936 and 1940 are generally low on the graph of annual figures, and fare changes probably contributed to this. On the basis of this evidence it was tentatively concluded that traffic volume was strongly influenced by the changes of fares and that, within the actual ranges of rate change, revenues would increase appreciably at lower fares.

Some improvements in equipment were introduced in the period 1935–40. On June 5, 1935, the streamlined "Comet" began mile-a-minute operation between Providence and Boston. The first of some two hundred new air-conditioned, streamlined coaches went into service late in 1934 and the remainder at irregular intervals thereafter up to the fall of 1938, although most Shore Line trains had been assigned this type of equipment by the end of 1936. In addition, many of the older cars in through service, including the de luxe coaches purchased in 1931, were air-conditioned.

The number of trains serving Shore Line points remained essentially the same until April, 1940, when frequency of service was materially improved. An hourly-on-the-hour leaving time between 8:00 A.M. and 6:00 P.M. was established from Boston and New York for trains connecting these two cities, and schedules for the run were cut fifteen to thirty minutes. The number of New York–New Haven trains was increased by 11 per cent, providing approximately half-hourly service between these points. Other schedules were also rearranged and new trains added. At this time, too, the extra fare for travel on the "Yankee Clipper" was abolished, leaving the "Merchants' Limited" as the only extra-fare train in the system.

Exhibit 5

GRAPHIC RELATIONSHIPS OF AVERAGE FARES, PASSENGER MILES, AND REVENUES FOR LOCAL TRAFFIC ON SHORE LINE OF NEW HAVEN RAILROAD, 1935–40



Source: William J. Dixon, *Elasticity of Demand for Railroad Passenger Transportation* (New Haven: Yale University Press, 1941), p. 21

Minor adjustments in the running times of Shore Line trains were made throughout the period under study, the only general change aside from that of April, 1940, occurring in July, 1935, when the schedules of most New York–Boston trains were speeded ten to fifteen minutes.

Aside from the influence of rate changes on volume of passenger traffic, it was possible that shifts in the level of business activity and in consumer income might have had some effect on travel. The Dixon survey, therefore, examined various indicators of business activity such as the Dun's Regional Trade Barometers for New York City and for Boston, department-store sales in New York and Boston, employment and payroll statistics and volume of toll calls. In order to learn whether business activity caused the deviations from the lines of relationship shown in Exhibit 5, actual passenger traffic volumes for each year were plotted as deviations against various series showing business activity. It was discovered from these studies that business activity "does have some effect on passenger traffic, but a tremendous increase or decrease in such activity is required to produce a noticeable change in the regular fare traffic taken as a whole."[3] In a similar manner, deviations were plotted against changes in consumer income as shown by data on family buying power published by *Sales Management* magazine. Again, the conclusion was that passenger traffic "variations with income level are not too striking."[4]

The Shore Line of the New Haven was faced with competition from four sources: private automobiles, buses, airplanes, and steamship lines. The short-haul character of the New Haven's traffic made it exceedingly vulnerable to highway competition, especially that of private automobiles. A comparison of automobile registrations in the three New England states through which the Shore Line passes with Boston–New York rail travel is presented in Exhibit 6.

Monthly figures for private automobile traffic on the Merritt Parkway, which extends from a few miles west of New Haven to the New York state line, parallel to U.S. Route 1 and the New Haven Shore Line, were available from electric-eye counts and toll-payment records of the Connecticut State Highway Department. The counts were started in March, 1939, twenty months after the first section of the parkway opened. Traffic along the parkway showed a 14.7 per cent increase in ten months of 1940 over 1939, while rail-

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[3] *Ibid.*, p. 39.

[4] *Ibid.*, p. 40.

Exhibit 6

PASSENGER CAR REGISTRATIONS FOR CONNECTICUT, RHODE ISLAND, AND MASSACHUSETTS, AND PASSENGER TRAVEL, BOSTON–NEW YORK, ON NEW HAVEN RAILROAD, 1929–40

Year	Passenger Car Registrations			Rail Travel, Boston–New York
	Conn.	R.I.	Mass.	
1929	278,057	111,010	719,436	1,276,024
1930	279,830	116,792	743,288	1,179,091
1931	302,594	118,313	736,302	971,178
1932	270,192	114,992	698,358	740,913
1933	285,563	118,296	689,934	623,095
1934	295,548	124,062	686,884	728,271
1935	308,402	130,169	684,973	803,463
1936	338,196	140,417	714,081	1,080,114
1937	368,473	148,583	742,521	1,206,599
1938	369,693	149,634	739,323	1,062,080
1939	387,299	155,369	765,656	1,125,581
1940	417,828	166,792	795,201	1,192,175

Sources: Car registrations from *Automobile Facts and Figures*. Rail travel from New Haven Railroad.

road traffic to New York in and out of New Haven and Bridgeport, adjusted to a 2-cent-fare level, would have dropped 9.3 per cent.

In Exhibits 7 and 8 are presented data for passenger traffic and fares, Boston–New York, on highway bus lines, airlines, and railroad.

Exhibit 7

BOSTON–NEW YORK PASSENGER TRAFFIC ON BUSES, AIR LINES, AND RAILROADS, 1929–40

Year	Buses	Air Lines	Railroad
1929	156,000	3,986	1,276,024
1930	229,000	12,279	1,179,091
1931	268,000	15,750	971,178
1932	295,000	15,286	740,913
1933	325,000	14,543	623,095
1934	289,000	18,417	728,271
1935	260,000	31,197	803,463
1936	220,000	45,139	1,080,114
1937	185,000	56,700	1,206,599
1938	205,500	81,012	1,062,080
1939	215,180	122,315	1,125,581
1940	233,796	168,994	1,192,175

Sources: Air-line traffic from American Airlines. Bus and railroad traffic from New Haven Railroad.

Some effect of reductions in rail fares in 1936 is evident in the decline of bus travel the following year. It is also possible that the rail rate increase in 1938 promoted the larger volume of bus travel shown for that year. No decline in bus travel followed the rail rate reduction of 1940.

Although the relatively high price of air travel made comparison with total regular-fare rail traffic of little significance, the volume of air travel had an important bearing on Pullman traffic. Pullman traffic accounted for 14 per cent of the New Haven's total passenger travel and for an even larger share of revenue. About 80 per cent of this traffic was between New York and Boston and New York and Providence. The survey showed a marked downtrend in Pullman travel over the period 1937–40. Although comparison of variations in coach travel and Pullman travel showed little relationship between these variables, comparisons of air travel and Pullman showed significant relationships. An increase in the former was clearly associated with a decrease in the latter. Likewise, Pullman traffic was found to be influenced appreciably by the level of business activity and total buying income.

Exhibit 8

BOSTON-NEW YORK ONE-WAY PASSENGER FARES FOR BUSES, AIR LINES, AND RAILROAD, 1929–40

Year	Buses	Air Lines	Railroad		
			Limited	Coach	Pullman
1929	[a]	$25.00 34.55[k]	$10.96	$8.26	$12.01
1930	[a]	17.43[l] 18.68[m]	10.96	8.26	12.01
1931	[a]	15.85[n]	10.96	8.26	12.01
1932	[a]	13.90[o]	10.96	8.26	12.01
1933	[a]	13.90	10.96	8.26	12.01
1934	[a]	13.90	10.96	8.26	12.01
1935	$4.25[b] 3.50[c]	13.90	10.96	8.26	12.01
1936	3.00[d] 2.95[e]	13.90	10.00[c]	4.60[c]	9.40[c]
1937	2.95	13.90	10.00	4.60	9.40
1938	3.60[h]	11.95[p]	10.00	5.73[f]	9.55[g]
1939	3.60	11.95	10.00	5.73	9.55
1940	2.95[i]	11.95	9.00[j]	4.60[j]	9.55

[a] Not available.
[b] Effective June 12, 1935.
[c] Effective June 1, 1936.
[d] Effective August 16, 1936.
[e] Effective September 15, 1936.
[f] Effective July 25, 1938.
[g] Effective August 1, 1938.
[h] Effective August 25, 1938.
[i] Effective March 25, 1940.
[j] Effective April 28, 1940.
[k] Effective June 1, 1929.
[l] Effective August 1, 1930.
[m] Effective October 1, 1930.
[n] Effective January 1, 1931.
[o] Effective March 1, 1932.
[p] Effective June 1, 1938.

In the period covered by this survey, four steamship lines competed with the Shore Line of the New Haven. The railroad's subsidiary, the New England Steamship Company, operated two lines, one of which engaged in service between New York and Providence and the other between New York and Fall River with boat-train connection to Boston. The Providence Line abandoned service in May, 1937, and the Fall River Line discontinued operations in July of that year. The independently owned lines, the Eastern Steamship Company and the Colonial Line, operated between New York and Boston over the entire period of the survey. Monthly figures of New York–Providence rail tickets sold showed no gain when the Providence Line discontinued operation in May, 1937. Officials of the New Haven were doubtful, however, whether the small volume of the Providence Line's traffic, averaging only five or six hundred passengers a month, would have influenced railroad traffic, which was over twenty thousand a month at that time. An increase in New York–Boston rail traffic in July over June of 1937, which ran contrary to the normal seasonal pattern, suggested that some of the Fall River Line traffic might have shifted to the railroad when that line abandoned service early in July. Company officials noted, however, that increases in traffic of the two remaining steamship lines, Colonial and Eastern, more than accounted for the passengers lost by the New England Steamship Company. It was also evident that reductions in rail fares had not resulted in taking business from the water carriers; in both 1936 and 1937 the Eastern Steamship Company and the Colonial Line experienced increases in traffic.

Exhibit 9

RAIL AND STEAMSHIP PASSENGER TRAFFIC,
NEW YORK BOSTON

Year	Local New Haven Railroad	Eastern Steamship	Colonial Line	New England Steamship
1935	395,854	168,390	14,680	39,514
1936	585,054	183,887	15,700	32,689
1937	710,664	206,221	23,020	13,139

Source: Willard J. Dixon, *Factors of Demand for Railroad Passenger Transportation*, New Haven: Yale University Press, 1947, p. 43.

In addition to the external competition of other forms of transportation, regular-fare traffic on the Shore Line was influenced by two types of internal competition: limited-train service and excursion traffic. Limited trains competed exclusively with Pullman traffic, excursions with regular-fare coach traffic.

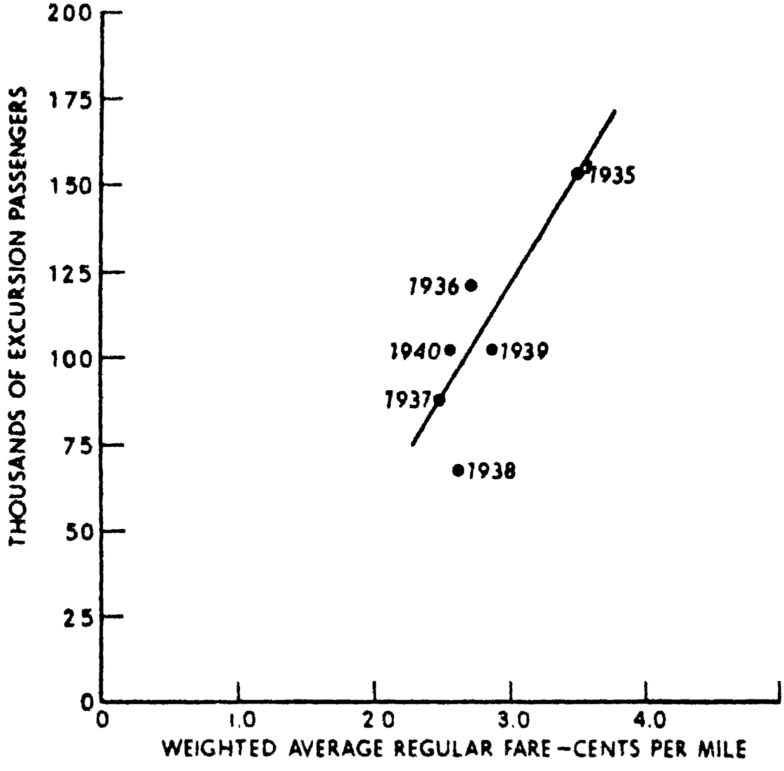
Two limited or extra-fare trains operated on the New Haven's Shore Line during the period under study until April 28, 1940, when one of them, the "Yankee Clipper," was taken out of that class of service. The principal feature of limited trains was their short schedule time between New York and Boston. Prior to April 28, 1940, this was four hours and thirty minutes; thereafter it was reduced to four hours and fifteen minutes. The equipment of extra-fare trains was not materially changed during these years except for remodeled diners; the Pullman, parlor, club, and observation cars were of standard design. The "Yankee Clipper" served all points except Bridgeport; the "Merchants' Limited" did not stop at Bridgeport or New London. During the period when both trains were operated, the "Merchants' Limited" always carried about 50 per cent more passengers than the "Clipper," possibly because of its five o'clock leaving time from New York and Boston compared to the one o'clock departure of the "Clipper." Prior to April 28, 1940, New York-Boston and New York-Providence passengers made up more than 90 per cent of the limited-train users. During this period about one-fourth of the Pullman traffic between these cities was limited-train traffic; after the "Clipper" was removed from extra-fare service this proportion dropped somewhat.

There were two principal changes in limited-train fares in the period 1935–40. The first occurred in 1936, when the Pullman rate was reduced to 3.0 cents a mile. At that time *extra* fares were increased, although the *total* fare on limited trains between Boston and New York was reduced from $11.95 to $10.00. In 1940 the total New York–Boston rate was further reduced to $9.00, with proportional reductions in the rates between other points. There was no increase in the New York–Boston and New York–Providence traffic on the "Merchant" because of this change. In fact, it did not even absorb any passengers from the "Clipper" when this train was removed from the extra-fare class. With the exception of July, during the entire year of 1940 until December the "Merchants'" monthly traffic was less than in 1939 when both trains were operating.

Several kinds of excursions were operated by the New Haven during the years 1935–40: Sunday and one-day holiday excursions, two- and three-day holiday excursions, weekday World's Fair excursions, and football excursions. The bulk of this traffic, however, was confined to the Sunday and one-day holiday excursions which

Exhibit 10

EXCURSION PASSENGERS AND AVERAGE REGULAR FARES, NEW YORK AND BOSTON-PROVIDENCE, 1935–40



Source: William J. Dixon, *Elasticity of Demand for Railroad Passenger Transportation* (New Haven: Yale University Press, 1941), p. 58.

were continuously in effect over this period. Excursion tickets, being at reduced rates, were valid only on certain trains, which were usually operated only for excursion passengers.

During most of this period the principal excursion rates approximated one cent a mile. In the period from April 30 to August 6, 1939, they were temporarily raised somewhat above this level. From 1935 to 1940 total excursion traffic between New York and Bridgeport, New York and New Haven, and New York and Providence-Boston declined from 400,000 passengers per annum to about 260,000. In this same period, of course, regular coach fares were reduced drastically. Exhibit 10 shows the graphic relationship of excursion travel and average *regular* fares, New York and Boston-Providence.

QUESTIONS

1. Was the demand for regular-fare passenger transportation on the Shore Line of the New Haven Railroad elastic or inelastic? Why?
2. From the standpoint of the New Haven management, was the reduction, on March 25, 1940, in the basic rate for coach travel a desirable move?
3. In the light of the Dixon report, is the result of this reduction, shown in Exhibit 1, one you would have anticipated? Why or why not?
4. What bearing have factors other than prices on the results shown?

APPENDIX TO CASE II-1

DISSENTING OPINION OF COMMISSIONER MEYER OF INTERSTATE COMMERCE COMMISSION[1]

It is said that the reduced fares will increase both gross and net revenues because of the increased volume of traffic which the railroads will secure through them. The crucial point in the entire report, therefore, is the prospective increase in the volume of traffic.

That the reduced fares will result in some increase in the volume of traffic may be admitted. The extent of that increase is a matter of speculation. That it will be sufficient, as found in this report, not only to offset the losses resulting from the reduction in the basic fares but sufficient to increase both the gross and the net revenue and correspondingly to improve the financial condition of the carriers is open to grave question. In fact, to me it seems almost a certainty that the expected result cannot be realized.

In my judgment the future of the passenger business of the railroads lies in the day coach. Basic fares of 2 cents and 3 cents, respectively, cannot attract to the railroads enough additional business to keep them whole, at least so far as the eastern district is concerned. I agree with the report that experiments which the railroads have been making for several years past must be continued, as pointed out in detail in the text. On what basis the equilibrium between competitive forces represented by competing transportation agencies will or can be established no one can now know. In my opinion it will not be on a basis of 2 cents and 3 cents, respectively, per passenger-mile on the railroads. A straight fare of 2 cents in coaches and 3 cents in pullmans will not recover to the railroads the volume of traffic which this report asserts will result from the reduction and which must result to avoid confiscation.

The report apportions the existing passenger mileage performed by the traveling public in the entire country as follows: Buses 3 per cent, railroads 7 per cent, private automobiles 90 per cent. This is the best estimate available. The report further assumes that the increased volume of passenger traffic for the railroads must come chiefly from the private automobile. I believe the latter also to be correct. However, in my judgment the basic fares of 2 cents and 3 cents can never recover from the private automobile the volume of traffic which this report assumes they will recover, and which they must recover in order to prevent outright confiscation under the order. The soundness of this analysis can be tested anywhere by any private automobile owner. Let me illustrate, using only the proposed basic fares in the comparisons.

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[1] *Interstate Commerce Commission Reports*, Vol. CCXIV, No. 26550 (February 28, 1936), pp. 259–61.

It is a notorious fact that private automobiles generally are not nearly used to the extent of their service life. The chief factor which enters into the decision on the part of the private automobile owner when he is confronted by the choice between using his automobile and riding on a railroad train is the cost of gasoline and oil. Depreciation does not enter because he has his automobile anyhow and he will not exhaust its service life. Everyone knows that the higher-priced heavy automobiles travel only 10 miles or less on 1 gallon of gasoline, while the lighter and lower-priced ones travel from 15 to 20 miles and more on a gallon. Where only one person travels the cost by train and by automobile may approximate each other rather closely, depending chiefly upon the cost of a railroad ticket compared with the cost of gasoline consumed by that particular automobile. When two or more travel the set-up is radically different. For two persons the alternative presented is that of 4 cents or 6 cents per mile for both together by rail, compared with from 1 cent to 2 cents per mile for both in a private automobile. Where three persons travel the comparison is between 6 cents and 9 cents per mile for the three together by rail, compared with from 1 cent to 2 cents for the three together by private automobile. As the number of persons in the group becomes still greater the decision against the railroad becomes more decisive. As I have stated before, any one owning an automobile can test this line of reasoning for himself anywhere where there are railroads and highways competing with one another. It is unnecessary to go into many minor factors such as weather, personal convenience, train schedules, location of railroads compared with highways, differences in time on the way, hours of departure or arrival, etc.

Facts like these demonstrate to my mind that much lower fares are needed than 2 cents and 3 cents respectively, in order to recover a large volume of business from the private automobile. Highly profitable trains falling into the class of so-called excursion trains, are being operated at fares much less than 2 cents per passenger-mile and even at less than 1 cent.

By reaching into pools of traffic of this kind and establishing fares which will attract that traffic at a profit, the railroads may reestablish themselves in the passenger business. No one claims that we can issue orders which will require such low fares on all traffic. That is a problem which is distinctly one for the management. The location of such pools of traffic must be discovered and developed by the individual railroads or groups of railroads. By application of commercial sales methods, with reasonable experimentation the railroads should be able to determine the extent to which low fares will be financially advantageous, just as a clothing merchant decides whether to sell suits that cost his customer $5 and less, or higher-priced suits.

Competition among Sellers

Case II-5: GENERAL MOTORS CORPORATION

The sharp recession in business activity which began in the summer of 1937 and continued through the spring of 1938 led economists and government officials to study a wide range of possible causes of the decline. Among the theories advanced to explain the downturn was the rigidity of prices maintained by large industrial companies. Failure to reduce prices in the face of declining demand, some critics believed, led to the reduction of output and employment. From several sources within and without the government arose a demand for the investigation of the economic power exercised by large corporations. Interest was centered particularly in the reasons why large companies failed to reduce prices in time of declining business. As a result of this agitation the Temporary National Economic Committee, a joint body representing both houses of Congress and the executive branch of the government, was formed to study the concentration of power.

On April 29, 1938, President Roosevelt transmitted a message to the Congress relative to the strengthening of the antitrust laws.[1] The message contained the following statements regarding price policies of large corporations:

> One of the primary causes of our present difficulties lies in the disappearance of price competition in many industrial fields, particularly in basic manufacture where concentrated economic power is most evident and where rigid prices and fluctuating pay rolls are general.
>
> Managed industrial prices mean fewer jobs. It is no accident that in industries like cement and steel where prices have remained firm in the face of a falling demand pay rolls have shrunk as much as 40 and 50 percent in recent months. Nor is it mere chance that in most competitive industries where prices adjust themselves quickly to falling demand, pay rolls and employment have been far better maintained.

The General Motors Corporation was the largest manufacturer of automobiles. Although, in 1938, there were twenty-two producers in the field, General Motors, together with Ford and Chrysler, accounted for 90 per cent of total output. In the past many companies had entered the field and subsequently failed.

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[1] Temporary National Economic Committee, *Investigation of Concentration of Economic Power*, Part I, p. 187 (Washington, D.C., Government Printing Office, 1939).

In the model year 1937–38, which began with the sale of the new model in November, 1937, the General Motors Corporation maintained fixed prices on its various makes of automobiles. The Chevrolet, for example, was maintained throughout the model year at an average price of $738.

In mid-summer of 1937 a sharp decline in production, income, and employment developed in the United States, and it was not until mid-summer of 1938 that any substantial recovery took place.

Certain economists took the view that the prices of large industrial companies were necessarily rigid in the short term. An examination by Dr. Homer B. Vanderblue of the pricing experience of the General Motors Corporation in the 1937–38 recession supported this view. The following excerpts are taken from an article by Dr. Vanderblue appearing in the *Harvard Business Review* for autumn, 1939.

PRICING POLICIES IN THE AUTOMOBILE INDUSTRY[2]

Incidence of Demand

It is mainly in the short-time sense that automobile price policy has been attacked as one of "rigidity." This was the burden of the criticism toward the end of 1937. It is a commonplace that when demand falls off, prices of neither manufactured goods, notably producers' capital goods, nor consumers' capital goods of considerable unit values, are cut quickly and drastically. The critics, however, ask the manufacturer to reduce his prices by such an amount as will make it possible to maintain sales and production volume. This is supposed to be simple arithmetic. Let the manufacturer throw considerations of cost and loss to the winds. Under this simple assumption—without inquiring as to its validity—it is, of course, easy for one not bothered by having to consider costs or losses to suggest that the problem of maintaining employment is at once simple and easy of statement if not of solution. But even if cost is to be ignored, a practical difficulty must be faced in appraising the demands of the market, should an attempt be made to translate the assumption into business policy. In the case of automobiles, no one knows how much of a price cut would attain the end sought. Indeed no one knows whether even a drastic price cut might not fail to attract any perceptible number of potential buyers, most of whom already own automobiles anyway.[3] In a period of recession when demand is shrinking steadily (it does not shrink all at once and suddenly steady itself on a new basis), perhaps not even a series of price cuts would maintain sales volume. If such a policy were once announced or even implied, demand would simply dry up, as buyers awaited the successive price declines. Under these circumstances, more inventories would pile up and a greater ultimate problem of liquidation would be created. The indigestion would become chronic.

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[2] Reproduced by permission.

[3] The fact is that a slump in buying always follows several good years in which consumers build up their inventory of unused transportation in new cars. They buy in good times, and refrain from buying in poor times, thus intensifying the depression. Manufacturers want to sell, consumers withhold purchases.

Conditions on the demand side of a market can never be known with the mathematical nicety that conditions on the supply side of that market can be appraised. There, it is cost which is significant and the determination of cost is a matter of the arithmetic of sound accounting. On the demand side, an attempt must be made to appraise what the market will pay. Here there can be no such mathematical precision. We can know what the market does pay; and we can know how much is sold at particular prices. But we *cannot know* how much more would be sold at a lower price or how much less at a higher price. At best the nearest approximation must be a guess with a wide range of error. Here we are in the realm of opinion and conjecture.

Above all, it is essential to appraise the elasticity of demand; and while this can perhaps be guessed at in very general terms, it cannot be measured with nicety. By elasticity of demand is meant the extent to which a given price reduction will induce larger purchases, and the extent to which a given price advance will curtail them. Such price changes must be made, not by a single company, but by the industry as a whole. Obviously no single company can act alone, since it cannot, in a competitive price field, be the *only* one to advance prices, and it will not be allowed by the others to be alone in reducing them. Significant, also, is the fact that the degree of elasticity of demand is probably different for the same commodity when times are good from what it is when times are bad. Almost certainly is this true of the demand for automobiles and trucks. These call for a considerable initial expenditure on the part of the consumer and serve different uses where the demand is governed by different considerations.

For some commodities, notably the bare necessities of life, demand is probably highly inelastic at all times. Thus, a low price will not cause much more salt to be used by individuals, or a high price much less, and the total amount of salt which will be consumed does not differ greatly whether times are good or bad. Its total cost is negligible in any individual or family budget. New automobiles are not necessities in the sense that salt is a necessity, and automobile purchases, involving a considerable expenditure per unit, are readily postponable and are *not* repeated at short intervals. Therefore, the elasticity of demand, *a condition existing at any one time*, is much less important in determining when the readiness to buy becomes real, than the degree or *intensity* of demand, which is a function of the state of prosperity in the economy. The intensity of demand is governed by a willingness to buy at any practical price.

The purchase of an automobile involves spending a substantial sum all at once, or making commitments for monthly installments of substantial amount over a period of months. Therefore it is clear that an important, perhaps the governing, consideration in the mind of any prospective purchaser of an automobile, new or used, is his appraisal of the probability that his current income will be maintained over a considerable interval of time. Such appraisal necessarily governs the intensity of his demand—his willingness to buy, and his ability to buy at any price within a reasonable range. It is not surprising, therefore that sales in the low-price field are a larger percentage of the total in poor times and a smaller percentage of the total in years of business expansion, or that the volume of automobile sales varies with the total national income. If national income is falling, sales of automobiles contract; if it is rising, sales expand.

Between 1929 and 1932–1933 national income[4] fell some 40%, but the retail value of new cars fell some 75%. Between 1932–1933 and 1937, national income rose about 45% while the retail value of new cars sold rose about 175%. A decline in national income of less than 10% between 1937 and 1938 was in turn accompanied by a drop in the amount spent for automobiles of about 40%.

If general business conditions are growing progressively worse, or if there is even fear that they will become worse, then it becomes well-nigh impossible to gauge how large a price cut would be necessary to maintain sales. Especially is this true for a commodity (automobile transportation) where there is a large supply already in users' hands and where both initial price and maintenance as well as operation costs are considerable. Necessarily also a cut in the price of new cars reduces the value of the used car, which is frequently the "first payment" in an installment purchase. The automobile is a durable consumer good, and the problems created by this condition are highly complicated ones, not susceptible of fine statistical measurement.

The difficulty of appraising the effect of a particular course of action is further aggravated by the fact that so many cars are sold on installments. Even a considerable price reduction becomes much less important when, instead of a lump sum, monthly installments are payable. On the other hand, buyers hesitate to assume such obligations, due at regular intervals over a period of months, when they are uncertain about the permanence of their current or near future income position. Instead, under such conditions, they try to build up reserve funds, and the willingness to buy an expensive article thus becomes more restricted as the purchase is postponed. Demand shrinks, and sometimes very rapidly, as it did in late 1929 and again in late 1937.

Another logical difficulty arises because of a frequent failure to distinguish between elasticity of demand (*a condition existing at any one time*) and the elasticity in one direction only, or rather the expansibility of the market which existed for automobiles in the years prior to 1926. This condition persisted over a period of nearly thirty years while the motor industry was growing toward maturity. So long as the big problem of the industry was to produce to fill a vacuum, new sales could be secured in volume by cutting prices, or by offering a low-priced car, which would be absorbed by buyers who did not yet own a car or who could trade down their old cars to buyers who had never before owned a car. Selling in volume and manufacturing in volume produced a condition of decreasing cost per unit of output in a growing industry. Large sales brought low unit costs, low prices meant large sales. The depression of 1907 was consequently taken by the industry in its stride, and that of 1921 caused a shrinkage of only 20% in retail sales of new passenger cars in that year. As a contrast, the shrinkage from 1929 to 1932 was over 70%, while in the 1938-model year a 50% decline occurred from that of 1937. In the period of automobile expansion new strata of buyers were attracted by pushing prices lower for small cars, until presently the whole price structure for automobiles was modified. Since 1926 even the *market* for automobiles has steadily become less expansible, a condition placing greater emphasis upon replacements and upon competition in quality rather than in price per unit. Replacements now constitute a major part of the domestic market for new cars.

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[4] National income as measured by the Department of Commerce series, "Income Payments to Individuals."

This being the case, demand has now become highly sensitive to changes in the business outlook. When general conditions improve, the readiness to buy, even if this involves going into debt, increases. Such was the situation in 1936 and early 1937 and again in late 1938. In late 1937, however, as doubts of the future became real, sales contracted sharply. In the technical phrase of the economist, the demand curve, which in the several preceding years had been pushing to the right (i.e. more cars could be sold at the same price), was falling back so rapidly that it gave no clue as to how far it would go.

. . . .

The painful experience of the automobile industry in 1937 and 1938 brings out clearly the difficulties which the industry faces when a sudden shrinkage of demand occurs.

Even after the event, it is not clear (or capable of any rational estimate that would be useful in the administration of practical affairs for a spot decision) how much of a price cut made in January or March, 1938, or both, or in each of the months January–June, 1938, would have been necessary to maintain car sales close to the levels of early 1937 or even at the levels of 1936. Quite conceivably such a policy publicly announced, or even whispered or rumored, would have dried up sales almost completely. Nor can one even guess the extent to which such sales, if realized, would have merely been borrowing from the 1939-model year. It is highly questionable whether anything except very substantial price cuts, involving heavy loss to the manufacturers, would have affected sales volume and employment in any important degree under the general conditions then limiting demand. Even deep cuts in price might have proved ineffectual. Who knows? Fear was high in men's minds; the memories of 1929–1933 were vivid.

The failure to cut prices drastically in 1938 was thus due, not to a failure to recognize the existence of the problems created by the shrinkage of demand, which were all too real, but to a realization that the problems were not simple. A race for lower prices, by introducing new uncertainties into a situation already very complicated, might well have resulted, not in larger sales but in smaller ones, in less production rather than more, in greater unemployment rather than less.

The policy followed was the policy which experience had taught worked quickest to stabilize the whole automobile industry—manufacturing and distributing. New complications in distribution and finance were not created. We have seen that the dealers were already heavily stocked with new cars. They also had large stocks of used cars, largely carried over from the heavy trade-in operations of late 1937. Instead of loading them with additional new cars the manufacturers curtailed the volume of car production until available supplies in dealers' hands (both new and used cars) should be in better adjustment with demand. By the summer of 1938 the situation was in balance again, and, with a sudden and unheralded pick-up in the demand for new cars, even before the introduction of new models in the autumn, it became evident that the crisis had been passed in orderly fashion.

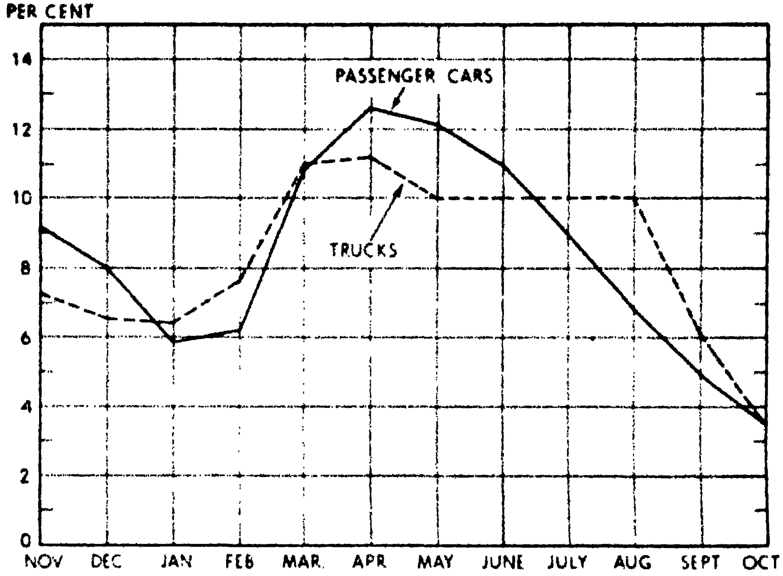
We turn next to a statistical analysis of the events of 1937-1938, and a measurement of the extent of the lessened intensity of demand which set the conditions under which the management of an automobile company worked in the critical months of those years. A governing characteristic of the demand for automobiles is a pronounced seasonal movement. With new car announcements coming around November 1, as has been the case since 1935, sales normally reach their peak in April and then fall away fairly steadily until the end of the model selling year in October. This seasonal movement reflects the governing importance of weather conditions on the sales of automobiles, especially the cold winter of the North (the major automobile market), which necessarily limits the amount of pleasure driving, and then the more moderate temperatures of the spring and summer. So well defined is it that a series of seasonal indexes can be calculated which measure the month-to-month changes in the intensity of demand through the year, attributable to seasonable influences.

Such indexes for deliveries of General Motors cars and trucks in the 1938-model year, based on November 1 announcement, are shown in Exhibit 1. The figures there charted indicate the percentage of total annual sales expected to fall in each month. They are slightly different as between the two classes of product, a natural enough condition since cars and trucks are bought for different purposes. Thus, the April peak of passenger car sales is the higher, because new car purchases are made to a considerable extent in anticipation of greater use later on; and the demand for trucks holds steady during the summer, when that for passenger cars is contracting. Even in the poorest years of recent automobile history (1932 and 1933) some spring pick-up in sales occurred.

The seasonal index is an especially useful tool in determining, month

Exhibit 1

SEASONAL EXPECTANCY OF DEMAND FOR GENERAL MOTORS CARS AND TRUCKS FOR 1938-MODEL YEAR



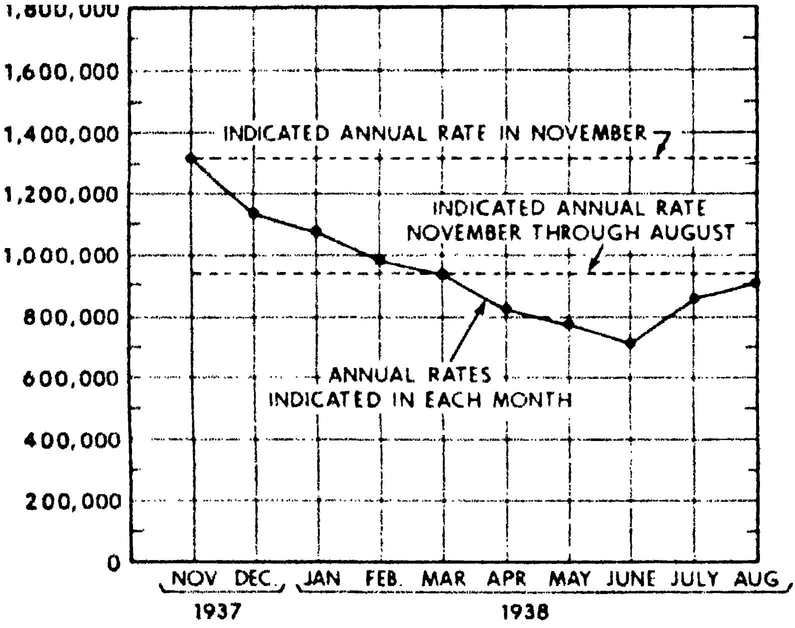
(Retail Deliveries in Each Month as Per Cent of Total Year)

by month, whether the volume of business in a particular month has shown the full seasonal expansion, characteristic of the months February–April, something more or something less, or whether the shrinkage of business in succeeding months has been greater or less than the normal expectation. In months when the actual expansion of sales exceed normal or when the actual contraction of sales is less than normal, demand has expanded (i.e. intensified). When the contrary conditions occur, demand has contracted. Intensity of demand is measured by the volume (or number of units) which can be sold at a given price. Since automobile prices were not changed in 1938 during the model year, we can, by comparing actual performance with the earlier seasonal expectations of probable performance in a particular month, measure the shift in the *intensity* of demand.

We begin with November, 1937 (Exhibit 2). If the November rate of sales of cars and trucks (for simplicity of presentation the two are here combined) had been maintained throughout the model year, with sales thereafter exactly conforming to the seasonal patterns illustrated in Exhibit 1 (demand neither contracting nor expanding), the total production of the year would have been represented by a horizontal line on the level of 1,319,000 units. Under these circumstances, the annual rate of de-

Exhibit 2

ANNUAL RATES OF RETAIL DELIVERIES INDICATED IN EACH MONTH BY ACTUAL MONTHLY DELIVERIES OF GENERAL MOTORS PASSENGER CARS AND TRUCKS



liveries (after allowance for the seasonal pattern) would have been constant over the year and the intensity of demand would have been steady.

What actually happened was something very different. In each month from November until July sales fell below the seasonal expectation of a month before. In other words, each month the annual rate of sales fell below the corresponding figure of the preceding month. This indicated a continuing reduction in the intensity of demand from month to month. In June, the low point of the year, sales were at the rate of 709,000 units per annum. Because the interim months had been above that level, while July and August showed a reversal of the trend, sales for the model year through August were at the annual rate of 930,000 cars and trucks, or approximately the March rate of sales. This is indicated by the lower horizontal line on the chart. The difference between 1,319,000 units and the unit sales through August at an annual rate of 930,000 vehicles measures the extent to which demand contracted during the model year 1938.

. . . .

But from November through June the contraction had been drastic and uninterrupted. Since prices remained unchanged, there had been, in the economist's phrase, a "leftward" shift of demand at the level of prices obtaining in the market for General Motors cars. Demand had become less intensive month by month.

. . . .

The economic principles behind the General Motors price policy have now been explained against the essential historical background. It has not been questioned that the prices of new cars are "administered," since they are not the result of individual bargain beyond the range of the used-car allowance. And with equal freedom, it has been recognized that automobile prices are not jiggled with the seasons or as the phase of the business cycle changes. They are not flexible prices, looked at as short-run phenomena, except as flexibility again is introduced by variations in the used car allowance.

. . . .

In any one year the public readiness and ability to buy may shift quickly from causes, quite outside the control of management, which have proved largely unpredictable either by government or by private agencies. The public readiness and ability to buy, not prices for new cars set within the narrow limits fixed by practicability, constitute the keys to employment in the automobile industry. An automobile is an expensive, durable consumer good. Purchasers of new cars frequently depend upon the ability to get a favorable trade-in allowance for a used car. The industry therefore faces the competition of a well stocked used-car market, and the existence of a huge reservoir of unused transportation in the hands of its potential customers. These can postpone purchases for a considerable time without lessening greatly the amount of transportation service currently used. They do so whenever, as in 1938, they become uncertain about the future of their own income status. When prospects are better, they buy more freely. Herein lies the answer to the wide fluctuation in automobile sales. It does not lie in the pricing policy.

QUESTIONS

1. What factors determine the elasticity of demand for automobiles?
2. What factors account for shifts in demand?
3. What effect have the size and number of sellers (manufacturers) in the automobile industry on the demand experienced by the General Motors Corporation?
4. Should the General Motors Corporation have reduced prices of new automobiles in the spring of 1938?

APPENDIX A TO CASE II-5

PRICE PROBLEMS, DEMAND FACTORS AND THE INDIVIDUAL AUTOMOBILE MANUFACTURER[6]

It is perhaps needless to say that we who are associated with the automobile industry have been working for a great many years on the problem of determining the factors which influence the demand for our product, including the price factor. However, most of the work done on this problem by people connected with the industry has been for the purpose of helping a particular manufacturer to decide the questions which confronted him in running his business. Thus, with respect to the effect of price upon sales, such studies as have been made have usually been undertaken for the purpose of determining the probable effect of a change in the price of a particular car upon the manufacturer's volume and competitive position, as against its effect upon his profit margin. Or, they have been undertaken in order to determine the desirability of bringing out a lower or higher priced line of cars, in which case not only the problem of price, but also the problem of a change in engineering specifications has to be considered. The automobile, like most manufactured products has certain minimum acceptable specifications and a change in specifications may have *more* influence upon volume than a change in price. Those are the kinds of price problems with which people connected with the automobile industry have been chiefly concerned. And until recently, the problem of determining for the industry as a whole the effect of price changes upon *total* sales of all makes has been of relatively little concern to individual automobile manufacturers. There are several reasons for this:

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[6] Excerpts from "A Statement of the Problem" by S. L. Horner of General Motors Corporation in *Dynamics of Automobile Demand* (New York: General Motors Corporation, 1939).

First, there is the difficulty of measuring price changes for the industry as a whole, in the case of a non-standardized product like the automobile. . . .

Second, such studies as have been made . . . have indicated that since the middle twenties when the growth factor became less important, the volume of automobile sales has been largely governed by . . . consumers' incomes and price changes appear to have had a relatively unimportant influence.

Third, the problem has seemed to have little practical significance, since in a competitive industry like the automobile industry, it would be impossible to get the manufacturers to act together to move prices up and down in order to try to stabilize volume. It might be argued that one manufacturer could adopt such a policy and force his competitors to follow him. But while competitors might be forced to follow when he cut prices, there would be no such compulsion when an individual manufacturer raised prices and the manufacturer who followed this policy would lose competitive position and probably could not stay in business long.

However, even though it would be unrealistic to assume that an individual manufacturer could do anything about the matter, as long as the industry remains on the present competitive basis, the proposal that industry should vary its prices for the purpose of attempting to stabilize volume has received such wide currency in the past few years that General Motors decided to have a study made of the effect of price changes in general upon the total volume of automobile sales.

. . . .

In order to arrive at a measure of the elasticity of demand for automobiles with respect to price, it is, of course, necessary to take account of the factors other than price which influence the intensity of demand in order that the influence of these factors may be held constant and the net regression of demand on price may be determined. It has long been recognized that the gross correlation of automobile sales with price is very low. Thus, early in the course of the present study, the question was raised of what factors other than price might be expected to govern demand fluctuations.

Without attempting to make a complete list one might mention as long-term factors:

1. The improvement in the product and the lowering of real price,
2. The decrease in the cost of operation,
3. The increased mileage of good roads,
4. Increasing length of car life,
5. The greater availability of service,
6. The increase in instalment buying,
7. The increase in population, and
8. Improved standards of living.

All of these have contributed to increasing car usage and the number of car owners. Since the middle twenties, the demand for new cars has been in large part for replacement, and a decreasing number of new owners has been coming into the market. In fact, during the depression there was an actual decline in the number of cars in use.

Apart from these long-term factors are the factors other than new car price which might be expected to influence the year-to-year changes in demand, among which are the following:

1. General business activity and national income (considering both the level and direction of change),
2. The distribution of national income,
3. The cost of living,
4. The psychological atmosphere—whether optimistic or pessimistic,
5. The extent and character of model changes,
6. The age of cars in the hands of new car buyers,
7. The number of cars scrapped,
8. The used car stocks in dealers' hands and the dealers' working capital position,
9. Financing terms—both the required down-payment and the length of time over which monthly instalments may be spread, and
10. Used car prices and trade-in allowances.

Superimposed upon these factors influencing year-to-year changes in the level of automobile demand are the factors which influence the distribution of sales within a particular year, among which are:

1. Seasonal variation,
2. The dates of new model announcements and new model stimulus,
3. The trend of general business activity and national income,

4. New car stocks,
5. Used car stocks and deliveries,
6. Price change anticipation,
7. Weather conditions
8. Abnormal interruptions in production,
9. Sales campaigns for both new and used cars, and
10. The relative prosperity of different geographical regions and different sections of the population.

. . . .

It should be emphasized that our attention will be directed to the demand for *new* passenger cars, as opposed to the demand for individual transportation service or car usage. This distinction is an important one, since the automobile is a durable good and the demand for transportation service, as provided by an automobile, may be satisfied in a particular year by merely running the old cars another year. Moreover, the demand for new cars is only part of the demand for car usage, since the latter may also be satisfied by the purchase of a used car. Prior to the middle twenties about the only way in which the demand for the use of an automobile could be satisfied was by purchasing a new car. But with something like 23,000,000 passenger cars in operation at the present time, and with a large supply of used cars available, the demand for car usage in recent years has come to be something much different from the demand for new cars.

. . . .

Over the longer term, the extent to which automobile usage is maintained or increased is an important influence upon the level of annual sales of new cars. But from the standpoint of year-to-year fluctuations in new car sales the total demand for car usage is not believed to be an important influence.[5] A failure to distinguish between the demand for car usage and the demand for new cars is responsible for statements frequently made which attribute an important influence upon the short-term fluctuations in new car sales to such factors as the cost of operating and maintaining cars, the extent of congestion in metropolitan areas, and the mileage of good roads. Such factors as these exert an important influence upon car usage but have only a long-term, indirect effect upon annual sales of new cars. Of course, this is not to say that, if costs of operation should suddenly jump in a particular year, the sales of new cars would not be importantly affected. But within the limits in which these costs

[5] The demand for transportation service or car usage is, of course, the primary demand, while the demand for new cars is the derived demand. Accordingly, the factors which influence the demand for and the level of car usage are extremely important to the automobile manufacturers. Relatively small changes in total car usage, because of the magnitude of the car population, exert a very much greater relative effect upon the level of annual new car sales. Moreover, the level of car usage together with the average length of car life determines the number of new cars that are required over a period to maintain the car population. But average car life, which is a function of both physical and economic factors, is capable of rather wide changes. Hence, changes in the level of car usage by themselves, are of little assistance in trying to explain the year-to-year fluctuations in new car sales.

have varied in the past, no direct relationships with year-to-year changes in new car sales can be ascertained.

APPENDIX B TO CASE II-5

THE NOTIONS OF DEMAND FUNCTION AND OF ELASTICITY[1]

The principal aim of this investigation is to arrive at a demand function for passenger cars. The phrase "demand function" is used in contrast with "demand curve" to emphasize the broad multi-factor meaning of demand as employed in this study. Thus a demand function is any formula or rule, mathematical or non-mathematical which connects the amount of a commodity taken by consumers with the factors which determine it.

When attention was first directed toward demand phenomena many decades ago, demand was usually considered in relation to price alone. Other factors were neglected as unimportant or taken to be of a long-term non-cyclical character, like population. The demand schedule and the demand curve were written: Demand = function of price. Or demand was plotted as ordinate in a graph, and price as abscissa. Various hypotheses with respect to the nature of the relationship were explored and a considerable body of economic theory was built upon the findings.

An early study of demand was tacitly assumed to be a study of "the" demand curve or of "the" elasticity of demand. In the first statistical studies which were confined to agricultural commodities such as wheat, corn, cotton, sugar and oats, price was the principal independent variable and satisfactory results were obtained. Auxiliary variables such as the general price level or national income were also used in some cases. Other variables were lumped together in what has commonly been called a catch-all time trend.

Such procedure yielded satisfactory demand relationships and will probably continue to meet with reasonable success in analyses of staple perishable goods demand. But the notion is entirely inadequate for consideration of durable goods.

Price is only one of many determining factors. Once regarded as the sole variable proper to a demand study, price need not, as a matter of fact, appear at all in the demand formula. Certain misleading ideas about the role of price must be cleared away. While price and price variation must play significant parts in accounting for actual variations in consumption of most agricultural products and of many other products, a broad economic area exists in which price and price changes can account for only a part of the actual variation in demand at least over the medium term. For a great number of items, variation in price merely induces short-term speculation and does not appear to be the most significant factor in accounting for variation in consumption.

Elasticity is a characteristic of demand with respect to a particular demand factor. It is the percentage change in the amount demanded corresponding to a one per cent change in the factor. Thus a price elasticity of 1.5 means that a 1 per cent drop in price will increase sales by 1.5 per cent. The notion of elasticity should be broadened to include income elasticity, and elasticity with respect to other factors.

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[1] Excerpts from "Factors Governing Changes in Domestic Automobile Demand," by C. F. Roos and Victor Von Szeliski in *Dynamics of Automobile Demand*.

. . . .

The results of the study seem to call for a revision of the idea of price elasticity, at least in so far as durable goods are concerned. The classical concept which placed price at the focus of attention was formulated at a time when economic analysis of price phenomena was largely in terms of perishable or semi-perishable goods. The inadequacy of this view is due to the fact that, for durable goods, purchase is dissociated from, or at least does not run parallel to, consumption; the period of consumption in the case of automobiles extends over a period of several years after the purchase. Dissociation is possible because of consumers' car stocks, which at times may be more than ample relative to consumers' demand for automobile transportation. These stocks, which are negligible for perishable and semiperishable goods, are a major factor in durable goods demand. Their effect is to accentuate the cyclical movements in retail sales independently of any price effect.

Price, though of some importance in explaining automobile sales, is clearly not a dominant factor. It appears, therefore, that the classical theory that business stability can be accomplished by rapid price adjustment, applicable though it may be to a perishable and semi-durable goods economy, cannot validly be applied to the modern durable goods economy; for such a theory disregards the most characteristic mark of durable goods, their durability.

. . . .

Values of the income elasticity computed for the years 1919–38 are:

1919	1.55	1924	1.80	1929	2.39	1934	2.19
1920	1.55	1925	1.94	1930	2.62	1935	2.20
1921	1.56	1926	2.08	1931	2.57	1936	2.25
1922	1.61	1927	2.20	1932	2.44	1937	2.40
1923	1.69	1928	2.25	1933	2.19	1938	2.58

This table shows that given conditions of an almost saturated market, as in 1938, the income elasticity can be as high as 2.5. Under more favorable conditions of an only partially saturated market, income elasticity may be only 1.5.

. . . .

The price elasticity is:

1919	1.03	1924	1.15	1929	1.41	1934	1.34
1920	1.04	1925	1.22	1930	1.51	1935	1.34
1921	1.04	1926	1.26	1931	1.48	1936	1.33
1922	1.05	1927	1.33	1932	1.44	1937	1.38
1923	1.05	1928	1.37	1933	1.30	1938	1.53

It is believed that this table gives the most accurate picture of the price elasticity for automobiles. It shows values ranging between 1.0 and 1.5, and a value of about 1.4 for the elasticity during 1937. This means that, in order to maintain 1938 sales at the 1937 level, each one per cent drop in sales due to the depression could be offset by a price decrease of .7 of one per cent.

Summarizing this evidence, the writers believe the 1.5 may be accepted as the elasticity of passenger car sales with respect to price, when price is defined as the unit value of low-priced cars; that it may be as high as 2.0 or as low as 1.0, that even the value of .65 is not unreasonable; and that other price indexes indicate generally lower elasticities.

How are these conclusions related to a view sometimes expressed that the price elasticity for automobiles ought to be very high, because automobiles are a luxury and price elasticities of most luxuries are, as a rule, high or greater than unity? A principal reason why elasticity is not higher lies in the durable character of automobiles, and in the fact that consumers have, over the short term, other ways of obtaining their automobile transportation. They can run their existing cars longer at the cost of somewhat higher repair bills, or they can obtain cars from the used car stock of dealers. As the used car stocks of dealers are in the neighborhood of three quarters of a million at the top of the business cycle, consumers thus have access to a considerable source of supply independent of new car production. This factor is becoming of increased importance on account of a general rise in the durability and quality of cars in dealers' stocks. Another important reason is that the cost which determines how many automobiles the population will maintain in service is a joint cost of which new car cost is only one item. Automobile sales can probably be stimulated more by development of cars with radically improved operating characteristics than by price cuts. Further, the classification of automobiles as luxuries is open to objection.

The influence of price on sales is outweighed by the powerful effect of the income factor, and also by changes in the policies of dealers on used car allowances and on used car stocks. As has been shown earlier in the discussion, dealers tend to stimulate new car sales during periods of prosperity by "discounting" used cars, that is, by exchanging cash or credits for them, and depress new car sales by selling their stocks of used cars during periods of recession.

The secondary importance of price also appears from the experience of other durable goods industries such as residential building and railway equipment. Response to price is present in these durable goods industries, and the price elasticities may be as high as 2 or 3, but these elasticities are insufficient to offset the large cyclical swings arising from the stocks of these goods in the hands of users and the variations in general production and national income.

Nature of the Product and Channels of Distribution

Case II-6: RANDOLPH PACKING COMPANY

The Randolph Packing Company of Detroit, Michigan, had engaged for many years in the business of slaughtering livestock, processing the raw material into fresh meat and manufactured items, and selling and distributing the finished products to wholesalers and retailers. The company slaughtered in the following proportions of total carcass weight:

	Per Cent
Pork	68
Beef	25
Veal	5
Lamb	2
	100

Livestock for packing operations was obtained from local farmers. The latter usually shipped their animals by rail or truck to the company's Detroit stockyards, where the animals were graded and paid for in cash at current market prices. Slaughtering and manufacturing operations in the Randolph plant were conducted under federal inspection to enable the company to ship its products in interstate commerce.

The company's fresh-meat products consisted of carcass cuts, such as loins, ribs, rounds, and chucks; the manufactured items were smoked and boiled hams, bacon, sausage products, meat loaves, chile con carne, luncheon meat, and several types of canned meats. The Randolph Packing Company sold its manufactured output in three grades, the top-quality grade bearing the brand name "Marvex."

All Randolph products except canned meats were sold through the company's own sales organization to wholesalers, retail stores, hotels, restaurants, and institutions, such as schools and hospitals. The company's salesmen regularly called on these customers both in Detroit and in many large eastern and middle-western cities. In the Detroit metropolitan area orders were filled in the shipping department of the plant and delivered directly to the customers by a fleet of refrigerated trucks. In other cities Randolph products reached purchasers by rail and cross-country motor-truck transportation, local delivery being handled by independent draymen.

The best-selling sausage item in the Randolph line was the frankfurter. The Marvex frankfurter enjoyed the reputation of being a top-quality food product. It was made solely of beef and pork tissue with no added cereal. Through advertising in public motor buses and streetcars and in metropolitan daily newspapers, the Randolph Company had promoted the name "Marvex" aggressively. In several communities the Marvex frankfurter had become the dominant brand. It was the company's policy to price its products, including the Marvex frankfurter, at levels competitive with other companies' products of similar quality.

Exhibit 1

PRICES, SALES, AND ADVERTISING EXPENSES FOR MARVEX FRANKFURTERS IN THE DETROIT AREA, 1944-47

Years	Average Price per Pound	Total Sales	Advertising Expenses
1944	$0.260	$1,398,000.00	$ 64,378.81
1945	0.260	1,284,800.00	73,182.27
1946	0.330	1,734,480.00	120,550.15
1947	0.405	2,428,272.00	172,538.00

In 1945, despite the fact that the Marvex frankfurter had wide consumer acceptance, Mr. Jay Randolph, president of the Randolph Packing Company, was not satisfied with the total sales volume of this item. He believed that the sales of the Marvex frankfurter could be appreciably increased if full advantage were taken of the already established consumer demand through better identification of the product. Under the firm's method of merchandising frankfurters the product was packaged in six-pound boxes with every fourth sausage encircled with a wax-sealed paper band carrying the Marvex name. Banding was done by hand and was too costly to be performed on every frankfurter. Less scrupulous retail distributors found it easy to remove the unbanded Marvex sausages from a box and substitute inferior sausages for them. Mr. Randolph believed that 25 per cent of the company's frankfurter business was lost through this practice, which not only deprived the Randolph Company of a large share of its sales volume but also harmed the company's reputation through the substitution of inferior products for its own. Company officers were determined to eliminate the loss of Marvex sales resulting from inadequate identification and substitution.

After a year of experimenting, the machine development division of the Randolph Packing Company built a test model of a frankfurter banding machine, which was designed to encircle and join all frankfurters together between two wax-treated paper strips in the manner of cartridges in a belt. This operation was accomplished by conveying the individual sausage between two bands, one band coming in from above, the other from below, and bringing an electrically heated sealing iron down on the bands between the sausages. The sealing iron also punched perforations across the middle of each ½-inch sealed section, allowing the sausages to be easily separated without loosening the seal on any individual frankfurter. This process was given the copyrighted name "Bullet-Band" packing.

The banding machine offered several advantages in production and distribution. Machine banding was faster than the hand operation because the machine banded ninety frankfurters per minute. Moreover, the machine cut-off device could be adjusted to give the desired number of frankfurters per strip for easy layer-packing in boxes. This reduced the packing cost for the company to one-fourth of its former amount. Faster packing, also, would be effected because the strips of ten frankfurters instead of single ones could be packed at one time. At the retail level easier handling was possible because the perforated bands allowed the frankfurters to be quickly separated without losing their identity. The neatly banded and identified product permitted attractive display, which arrested customer attention. The most important advantage of the new process, however, was that every frankfurter carried the full Randolph and Marvex brand label, thereby positively eliminating the possibility of substitution. In January, 1946 Marvex frankfurters appeared on the market identified by the new Bullet-Band individual brand labels. At this time the Randolph Company also began an advertising campaign to inform the public that henceforth no frankfurter was a Marvex unless it was encircled by the Marvex band.

Several highly reputable competitors, each of whom produced quality frankfurters comparable to Marvex but under their own brand names, applied to the Randolph Company for the privilege of leasing Bullet-Band labeling machines. After some discussion the directors of the company agreed to make machines available to other meat processors on a rental basis. This was accomplished through an arrangement with an intermediary, the Marshall Corporation, a paper-products manufacturer specializing in the development of packages and packaging materials. Under a contractual arrangement, Randolph leased machines to Marshall for releasing to users at a stipulated figure, which covered Marshall's servicing and maintenance expenses on the machines. Being in a position to lease these machines gave Marshall the opportunity to offer users its specially developed wax-coated bands for reliable sealing. Although the lessees were under no compulsion to purchase Marshall bands, it was found that almost all did so because of the assurance of the band's proper strength and adhesion. Under this arrangement the Randolph Company was relieved of all details of leasing and maintaining the machines. As a matter of policy, Randolph leased machines to Marshall on very liberal terms and stipulated equally liberal conditions for releasing. The leasing operation, therefore, yielded only a nominal profit to Randolph, but the company believed it would find much advantage in the extension of positive brand identification to competing products.

Exhibit 2

RETAIL MEAT PRICES, PER CAPITA CONSUMPTION OF MEAT, AND AVERAGE WEEKLY EARNINGS OF WORKERS, 1935-47

Year	Retail Meat Prices (1935-39 = 100)	Per Capita Consumption of Meat Pounds	Av. Weekly Earnings of Workers in Manufacturing Industries
1935	99.9	116	$20.13
1936	98.9	128	21.78
1937	105.8	125	24.05
1938	98.9	133	22.30
1939	96.6	142	23.86
1940	95.8	142	25.20
1941	107.5	139	29.58
1942	126.0	139	36.65
1943	133.8	153	43.14
1944	129.9	144	46.08
1945	131.2	153	44.39
1946	161.3	157	43.74
1947	217.1	141	49.23

Sources: Retail meat prices, U.S. Bureau of Labor Statistics; meat consumption, U.S. Department of Agriculture; average weekly earnings, U.S. Bureau of Labor Statistics.

QUESTIONS

1. What effect did the introduction of Bullet-Band packing have on the demand for Marvex frankfurters?
2. Are the gains in sales volume of Marvex frankfurters in 1946 and 1947 attributable to Bullet-Band wrapping?
3. Was the Randolph management well advised to lease banding machines to its competitors?

Case II-7: ATLAS MACHINERY COMPANY

The Atlas Machinery Company was a manufacturer of a diversified and well-known line of industrial equipment. In the fall of 1945 the company was approached by a large mail-order house with the offer of an annual contract for 5,000 control units for hot-water circulating furnaces. The control units were to be sold under the brand name of the mail-order company at a retail price of $50. The Atlas Machinery Company had not hitherto engaged in this type of production, but, since wartime expansion had left it with ample plant capacity, the company decided to contract with the mail-order distributor for the suggested number of control units at a wholesale price of $30. The mail-order company intended to sell these control units to householders who would themselves install the units in residential heating systems. Installation required some mechanical knack, a few simple tools, and the expenditure of about five hours' time, but the mail-order distributor believed that retail sale of the units would be feasible if complete printed instructions were supplied with each unit.

By the end of 1946 retail sale of furnace-control units made under this contract had proved highly successful. As a result, the contract was renewed on approximately the same terms for 1947, and the total number called for under the contract was increased to 8,000 units. Again the results were highly successful. In the spring of 1948, therefore, the Atlas Machinery Company was considering the possibility of entering the furnace-control market under its own name. The president of the company, Mr. George MacDonald, requested the research director to study the potential market for furnace controls distributed through the usual jobbing channels.

Early in the survey Mr. Wilson, the research director, discovered that the Warren Company was the dominant producer of furnace controls, accounting for 50 per cent of the entire market. Warren was an established firm which had sold heating controls for over fifteen years. During most of this period it had advertised in trade papers; it had also built up an excellent reputation for servicing the products. In addition to control units, the Warren Company sold a full line of related heating equipment. The survey showed the Ohio Equipment Corporation, which sold a product of comparable quality and price, to be a poor second. The rest of the market was shared by a large number of small companies. Many plumbing-supply distributors indicated that by preference they handled Warren products and only in periods of shortages were they prepared to sell the products of competitors.

The popularity of the Warren Company's line was attributed primarily to the quality of the product, to its wide acceptance in the industry, and to good service. Mr. Wilson noted that in several cities the Warren Company maintained resident factory service representatives who handled all repairs sent in by distributors. This type of service was particularly important in cases where the original installation was made by a plumber who was not permitted, under union rules, to work on electrical parts of the equipment.

The Warren Company was accustomed to distribute heating controls through central distributors in large cities, who bought from the factory at a price of $33.75 per unit. Central distributors sold to jobbers at a maintained price of $37.50, and jobbers, in turn, sold to plumbers, independent hardware stores, and retail plumbing-supply dealers at a standard wholesale price of $50. Retailers sold the control unit to the public at various prices, ranging from $59 to $75. Thus there were four price levels in the distribution system as the product passed from factory to final consumer. Plumbers, however, who accounted for 75 per cent of all sales, sold the unit only on an installed basis, and, under these circumstances, material costs of the job were not separately billed to final purchasers. Many installations made by plumbers were under subcontracts with general contractors who were engaged on constructing residences and industrial structures.

The survey by the Atlas research department noted that there were three common types of central heating plants used in residences. These were, warm air, hot water, and steam. The hot-water system was the only one that utilized a heating-control unit of the type which the Atlas Machinery Company was contemplating putting on the market. Market demand for furnace-control units, the survey found, derived from two sources: (1) new construction and (2) conversion of existing hot-water systems.

Since steam as a type of heating was confined almost entirely to apartments and multiple-dwelling units, the research department based its estimates for new construction demand entirely on one- and two-family dwelling units. The 1940 Census showed that 14 per cent of all dwellings of this type had hot-water systems. It was noted, however, that in the two decades prior to 1940 there had been a trend in new construction away from hot water and toward warm-air heating systems. A survey of 4,007 urban families in 1944, for example, showed that, if consumer preferences were followed, only 11 per cent of new construction would use hot-water heating systems. For this reason the research department based its estimates on the conservative assumption that, henceforth, only 10 per cent of all new construction would be heated by hot-water systems.

In 1947, according to a Joint Congressional Housing Committee report, an estimated 825,000 homes were started. Estimates of the U.S. Department of Commerce and the U.S. Department of Labor placed residential construction for 1948 at a level about 25 per cent higher than that of 1947 in dollar volume and noted that, "although the average for 1948 is expected to be somewhat higher than the average for 1947, the increase is expected to be substantially less than that from 1946–1947." Housing authorities estimated that new home construction in the next five years would average close to the 1947 figure. On this basis there would be a total of 4,125,000 new homes constructed in this five-year period. Since 10 per cent of these homes would probably adopt hot water as a heating system, 412,500 hot-water systems, therefore, were estimated as the number to be installed in a period from 1948 through 1952.

Controlled hot-water heating afforded several important advantages over noncontrolled systems. Fuel savings could be effected by operating at lower water temperatures, size of radiators and pipes could be reduced, and faster thermostatic control could bring both economy and convenience. These advantages of controlled hot-water systems led the research department to believe that virtually all the hot-water systems to be installed in the period 1948–52 would be of the controlled type.

Of the total sales potential of 412,500 units in the five-year period beginning with 1948, the Atlas Machinery Company believed that, in addition to its mail-order sales, it could obtain a fair share of the total market. The research director's report on this subject was as follows:

> The Atlas Machinery Company's percentage of the total market will be limited by the fact that the Warren Company has established a strong footing in the field. They are known to have a good service department set-up. Warren also has the advantage of selling related heating equipment. They have been in the furnace control business about fifteen years and advertise in national magazines. On the other hand, the current shortage of control units looks encouraging. It would appear that Atlas can capture 10 per cent of the market in the next five years, a sales volume of 8,000 control units per year in new housing installations.

A second source of demand for heating-control units was the conversion market. The term "conversion" applied to the addition of control units to hot-water systems that had formerly not been operated by automatic controls. Although there was little statistical information upon which to base an estimate of demand in the conversion market, certain facts were known:

1. There were about 4,000,000 controlled hot water heating systems in 1947.
2. According to the Urban Housing Survey conducted by the Curtis Publishing Company in 1944, 13 per cent of the 4,007 heads of families who were interviewed intended to make repairs on existing heating systems at an average estimated cost of $338.
3. The market for heating controls in several local areas which were surveyed by the research department of Atlas Machinery Company appeared very promising with regard to the conversion of heating systems.
4. Cultivation of the conversion market was retarded by the inability of manufacturers to keep up with current demand.

On the basis of the above facts, the director of research, Mr. Wilson, estimated the conversion market as about equal to the new construction market. Because of the absence of reliable statistics, however, the research group set potential sales in the conversion market at 25 per cent of the demand estimated in the new construction market. This component of total demand, therefore, was 2,000 units per year.

In addition to the two components of the total market mentioned in the preceding paragraphs, there was a smaller but regular demand from nonhousing installation for furnace-control units. This

Exhibit 1

RESIDENTIAL CONSTRUCTION, JANUARY, 1946–DECEMBER, 1947

	New Construction Private Residential (Million Dollars)	Est. Number Nonfarm Dwelling Units Scheduled to Be Started		New Construction Private Residential (Million Dollars)	Est. Number Nonfarm Dwelling Units Scheduled to Be Started
Jan. 1946	$136	44,800	Jan. 1947	$300	40,800
Feb.	159	49,700	Feb.	281	45,500
Mar.	195	84,700	Mar.	285	64,100
Apr.	244	83,700	Apr.	306	73,500
May	288	85,300	May	342	74,500
June	317	76,100	June	387	83,400
July	329	78,300	July	429	83,400
Aug.	345	81,800	Aug.	461	90,400
Sept.	340	65,800	Sept.	490	94,000
Oct.	330	60,200	Oct.	530	98,100
Nov.	320	46,600	Nov.	565	75,900
Dec.	300	35,200	Dec.	555	63,300

Source: *Survey of Current Business*, March, 1948, p. S-5.

was chiefly from industrial companies, and the magnitude of this demand was unknown.

The president of the Atlas Company, Mr. MacDonald, believed that the recommended *retail* price for the control unit, when sold through regular distributors, should be $50, the same as that at which the mail-order company was accustomed to sell. He suggested, further, that the company distribute directly to jobbers in large cities, by-passing central distributors.

The research director disagreed with the president's conclusions and suggested that the greatest revenue would be derived by adopting suggested retail prices identical with those of Warren and by following the same wholesale price structure.

QUESTIONS

1. What factors determine the elasticity of demand for control units sold through jobber channels? Is this demand more or less elastic than the mail-order demand? Why?
2. Was the president of Atlas justified in believing that $50 was the best retail price for the unit both in regular and in mail-order channels?

Changes in Consumer Income

Case II–8: RETAIL SALES AND CONSUMER INCOMES

The following excerpts are taken from an article by Louis J. Paradiso in the *Survey of Current Business*.[1] Technical footnotes, as well as discussion of the outlook for retail trade in the postwar transition—both of which appeared in the original—are omitted from the present text.

> In view of the many perplexing problems which retailers face, an examination of the factors affecting the volume of retail trade should prove of value in appraising the outlook for the near future. This report appraises the status of retail trade by kinds of business in 1944, the peak year of our war effort, indicating how retail volume is affected by changes in purchasing power of consumers. . . . But of more fundamental importance is the analysis of how retail sales by kinds of business are related to consumer incomes, and the demonstration of the manner in which these relations can be used as guides to the analysis of post-war markets.

. . . .

SALES VERSUS PURCHASING POWER

That consumers would have purchased more goods had the usual variety been available is clearly evident on the basis of their past performance

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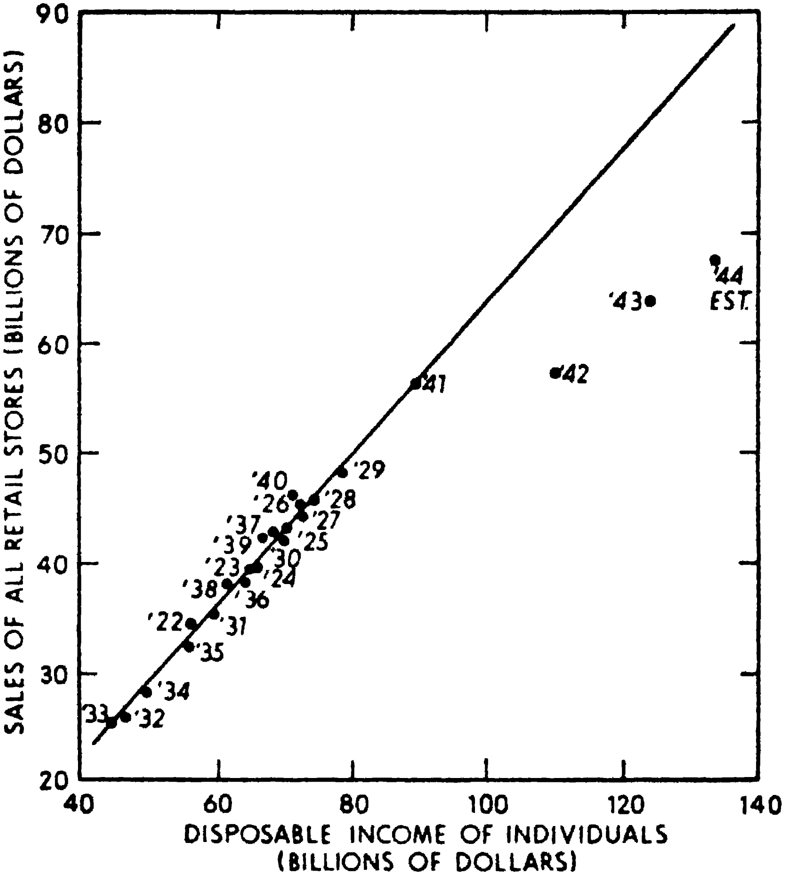
[1] Vol. XXIV (October, 1944) pp. 5-14

Exhibit 1

RELATIONSHIP BETWEEN SALES OF ALL RETAIL STORES AND DISPOSABLE INCOME OF INDIVIDUALS*



* Line of regression fitted to data, 1922–41.

as is shown in Exhibit 1. The chart shows the close relation between the disposable income of individuals (their total income remaining after payment of personal taxes) and sales of retail stores. It is to be noted that for the 20-year period 1922–41, the points indicating the sales and income for each year fall very closely about a well-defined straight line representing the sales-income relationship. On the basis of the experience covered by the 20-year period, an increase of 10 per cent in disposable income of individuals was accompanied by an increase of about 12 per cent in retail sales. Expressed in other terms, the relationship implies that about 70 per cent of any given increase in disposable income went for purchases of goods at retail stores.

The persistence of this close correspondence in movement throughout the peacetime period is indeed striking. In fact, the average annual error in the sales as computed by the formula from the actual sales for the entire period is only 1.4 per cent while the maximum error, which occurred in 1940, is only 4 per cent.[3] This means that the change in consumer income is by far the most important factor that retailers need to consider in determining the outlook for their business. Retailers have always known this as a general proposition; the significant feature is the very high degree of correlation.

Although sales and income have followed a closely related pattern in the peacetime years, such was not the case during the war years. The chart clearly indicates the effects of wartime shortages of goods. In contrast to the prewar years when all points were close to the line of relationship, the points for 1942, 1943, and 1944 were considerably below the line. It follows that retail purchases during the war period have failed by a wide margin to keep up with the wartime expansion in incomes.

There is little reason to believe, however, that if supplies had been freely available consumer purchases would not have been in line with the past relation to income. Although it is impossible to determine how the straightline relationship might have shifted in the area of the recent high levels of income in the absence of past experience at these levels, nevertheless, within the range of the past experience there is no indication of a shifting of the line as income increased.

Assuming, therefore, that consumers would have purchased goods in accordance with their past behavior, it is estimated that retail sales in 1942 would have exceeded the actual sales by 13 billion dollars, in 1943 by 17 billion dollars and in 1944 by almost 20 billion. In other words, the total discrepancy between potential sales and actual sales during the war period amounted to almost 50 billion dollars.

This discrepancy has its counterpart in the greatly increased savings of individuals. These savings took such forms as increased cash holdings, purchases of war bonds, and the reduction of debt. Indeed, it appears that the 50 billion-dollar discrepancy noted above is about equal to the total volume of liquid savings of individuals in the 3 year period 1942–44, after allowance is made for the normal increase in liquid savings which would have taken place at the corresponding levels of income.

The wartime restrictions on the civilian use of metals and other critical materials had their impact primarily on retailers selling durable goods. The effect of the curtailment on sales of these stores may be seen from the fact that while in 1939 their sales constituted 25 per cent of total retail sales, in 1942 they accounted for only 17 per cent and in 1944 the proportion is estimated at 14 per cent.

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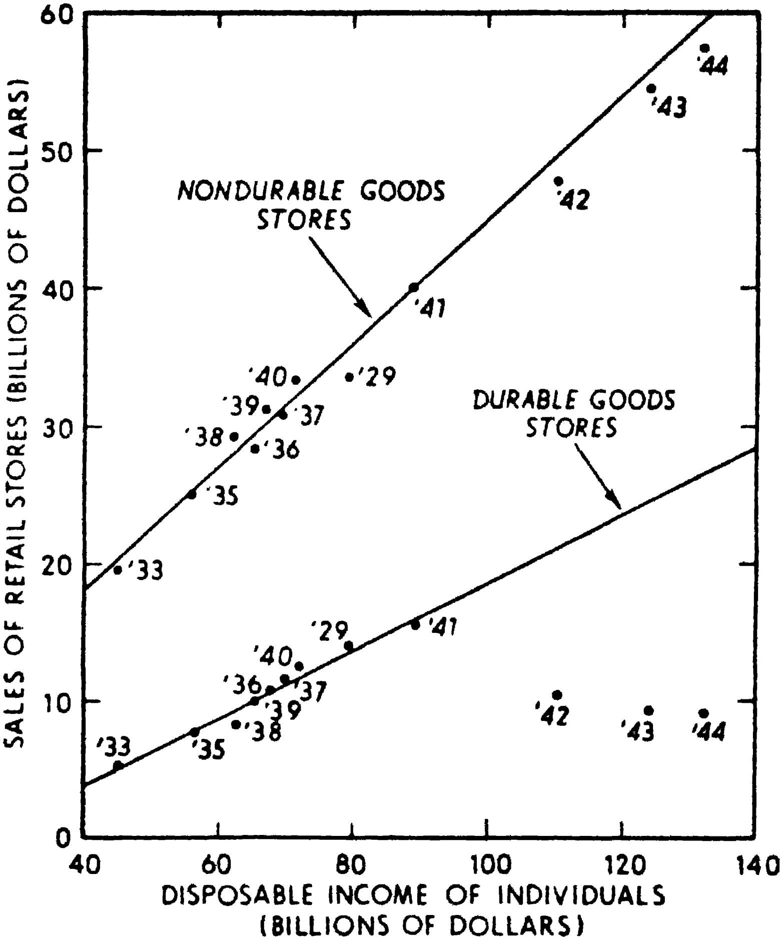
[3] The error is computed as the difference between actual sales and calculated sales expressed as a percentage of the calculated sales.

Exhibit 2

RELATIONSHIP BETWEEN SALES OF DURABLE AND NONDURABLE GOODS, RETAIL STORES, AND DISPOSABLE INCOME OF INDIVIDUALS*



* Lines of regression were fitted to data for selected years, 1929-41. The observation for 1944 is estimated.

Even more striking is the contrast in the sales of these stores with the sales of the nondurable goods stores, in relation to the disposable incomes of individuals, shown in Exhibit 2. In the peacetime years since 1929, sales for each group of stores were very closely associated with the changes in incomes. The experience in these years indicates that an increase in the disposable income of 10 per cent resulted in a rise in sales of durable goods stores of 18 per cent. This increase in sales may be thought of as the sales-equivalent of income. From the demand side this may be termed the demand-elasticity. The sales-equivalent for the nondurable goods stores is much less, amounting to 10 per cent or a one-to-one equivalence. This means that the demand-elasticity for durable goods is almost twice as much as for nondurables.

Since 1941, however, the sales-income relations of these two groups of stores have shown sharply divergent patterns. The upper section of Exhibit 2 pictures a most interesting development, namely, that sales of nondurable goods stores in the war period continued to increase in almost the same relation to income as in the prewar years. That they were very slightly below the line of relationship in the war years is accounted for almost entirely by the greatly reduced sales of filling stations resulting from the sharp cut in supplies of gasoline available for civilian use.

In marked contrast to this stability in the nondurable goods outlets, sales of durable goods stores fell very sharply below what would have been expected on the basis of the purchasing power of consumers. It is this group of stores that account for practically the entire discrepancy between the potential retail sales and the actual sales during the war period. For the 3-year period 1942–44, this discrepancy between sales that could have been expected at durable goods stores, in view of the high levels of income, and actual sales amounted to 45 billion dollars. For the nondurable goods stores the discrepancy was less than 5 billions.

It must not be concluded from this analysis that there will necessarily be a sales gap of 50 billion dollars to be filled by consumers at retail stores after the war is over. The deferred demands will be far less than this. While it is true that the pent-up demand for goods, particularly the durables, will be substantial, the magnitude of this demand will depend not so much upon the accumulated savings of individuals but on many other factors, the most important of which will be the prevailing level of employment and of consumer incomes in the post-war years.

. . . .

SALES EQUIVALENTS

Of particular interest to retailers is the effect of a change in consumer income on sales by kind of business. It is well known that when incomes of individuals are on the increase certain lines of trade will feel the effects to a much greater degree than others.

. . . .

These sales-income relations are not only useful in indicating the trends and shifts in sales since 1929, but they also determine the demand elasticity, or sales-equivalent for the goods sold in each kind of business. Such measures of the sales-equivalent can be helpful guides to retailers in the transition period and more importantly so in the post-war years after full reconversion of industry has taken place. Exhibit 3 presents for each kind of business the sales-equivalent associated with a 10 per cent change in disposable income of individuals. These are based upon the experience

Exhibit 3

SALES-EQUIVALENT OF A CHANGE IN INCOME, BY KINDS OF RETAIL BUSINESS

Kind of Business	Per Cent Change in Sales Resulting from 10 Per Cent Change in Disposable Income of Individuals	Sales Equivalent Group (Per Cent)
All retail stores:		
Durable-goods stores	12	
Nondurable-goods stores	10	
Motor-vehicle dealers	19	15–20
Jewelry stores	19	
Liquor stores	19	
Building-materials dealers	18	
Household appliances and radio stores	17	
Furniture and home-furnishings stores	17	
Auto parts and accessories stores	17	
Family and other apparel stores	15	
Hardware stores	14	10–15
Men's clothing and furnishings stores	14	
Women's apparel and accessories stores	10	
Shoe stores	10	
Eating and drinking places	10	
Department (including mail-order) stores	9	Under 10
Other general merchandise and dry-goods stores	9	
Fuel and ice dealers	9	
Drug stores	8	
Grocery and combination stores	7	
Filling stations	6	
Variety stores	5	

prevailing in each line of trade from 1929 to 1941. The lines of trade in the table are in order of decreasing sales-equivalent.

It may be noted that the retail sales most sensitive to changes in consumer incomes are those of motor vehicle dealers, jewelry stores and liquor stores. Each of these has a sales-equivalent of 19 per cent. At the other end of the scale the least sensitive are variety stores, filling stations and grocery stores, having a sales-equivalent of 5, 6, and 7 per cent, respectively. On the basis of these sales-equivalents retailers can determine the change in sales to be expected with a given change in disposable income of consumers. For example, a decline of 5 per cent in disposable income may be expected to result in a decline of 7 per cent in sales of men's clothing and furnishings stores.

The sales-equivalents are valid if all the factors influencing sales other than disposable income are constant from one year to another. In determining the effect on sales of a given change in income for the same year no modifications need to be made to the results obtained by the use of the sales-equivalent given in the table. However, if the effect on the sales is to be determined for a given change in income from one year to another some allowance must be made for the upward or downward tendency through the years shown by a number of lines of trade.

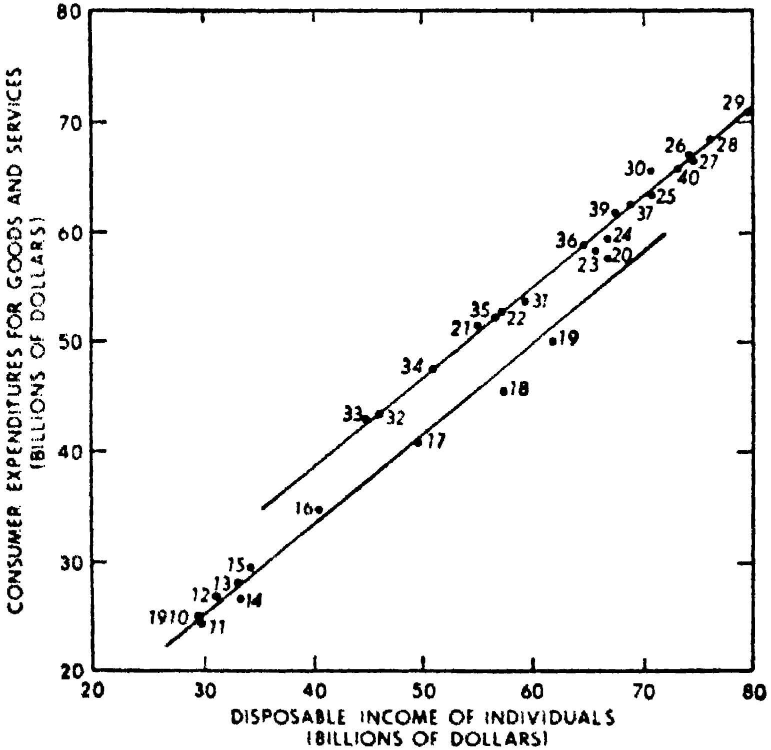
. . . .

RETAIL SALES AFTER TRANSITION

The period of transition will be essentially one of readjustments for the economy as a whole and in particular for retail trade. Difficult as the problems will be in this period, retailers are also vitally concerned with the prospects in the period following the transition. Will consumers alter their buying habits or will the prewar patterns tend to prevail after most of the pent-up demands have been satisfied? Will consumers' purchasing power be maintained at sufficiently high levels to permit a profitable volume of retail sales in the post-war year? Will new products be introduced which will stimulate industry and commerce and in turn generate an in-

Exhibit 4

RELATIONSHIP BETWEEN CONSUMERS EXPENDITURES FOR GOODS AND SERVICES AND DISPOSABLE INCOME OF INDIVIDUALS*



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* Upper lines of regression fitted to data, 1921–40, lower 1910–20.

creasing volume of retail purchases? Obviously, the answer to these questions must wait upon future developments and cannot be given at this time.

However, some light on possible post-war trends can be obtained by a study of the experience in the periods before and after the first World War. Exhibit 4 presents the relation between consumer expenditures and disposable income for the years 1910 to 1940. A similar pattern would have been obtained if sales of retail stores, which constitute about two-thirds of all consumer expenditures, had been used.

Two significant observations may be made from this chart. The first is that the relation between the *level* of expenditures and income for the period 1910 to 1920 did not continue into the 1920's and 1930's. A shift in the relation occurred. The shift was such that consumer expenditures for the same amount of income were generally about 5 billion dollars higher in the period after 1920 than in the earlier period. The implication of this is that consumers saved a relatively larger proportion of their incomes in the earlier period. The second observation is that despite the difference in the *level* of expenditures in the two periods, a given *change* in consumer incomes resulted in the same proportionate change in their expenditures for each of the two periods. For example, an increase of 10 billion dollars in disposable income in either period resulted on the average age in an increase of 8 billion dollars in expenditures or, an increase of 5 billion dollars in income resulted in an increase of 4 billion dollars in expenditures.

That the relation between absolute *changes* in consumer expenditures and absolute changes in disposable income has been stable in the 30-year period since 1910 is indeed striking. It persisted under widely varying conditions—in a world war, in the prosperous years of the twenties when many new products and industrial techniques were developed, in the great depression and in the subsequent recovery years. The continuity of the relation provides a highly valuable guide in appraising post-war trends in retail sales. On this basis retailers can determine what the effect of a change in the disposable income of individuals in the post-war years would be on total retail sales. . . .

It must be emphasized that this conclusion is applicable to a determination of the changes in total retail sales and not necessarily to the changes in the sales of any particular line of trade or of any individual firm. In appraising the sales prospects of particular firms or kinds of business, special developments applicable to the individual firm or business must also be taken into consideration.

In order to determine total sales, however, retailers must know not only the change in sales corresponding to a change in disposable income, but also the level of sales which would correspond to a particular level of disposable income. The answer to this latter problem is more difficult to determine, since past experience has shown that in certain periods consumers have tended to alter the savings-income pattern. Will the level of consumer expenditures in relation to incomes tend to shift in the post-war years as was the case in the years following the first World War? Will the expenditure pattern be established at a higher level relative to that of the 1921–40 period?

While the answers to these questions cannot be given, several observations may be made on possible post-war trends. Despite the fact we do not know what the expenditure-income pattern is likely to be in the future, the close correlation between consumer expenditures and incomes in the period from 1921–40 provides the basis for the post-war outlook. Certain developments, however, might result in an upward shift in the relation with a corresponding lowering of the savings-expenditure ratio. New products may come forth which will "catch" with the masses of the population and result in wide repercussions on the nature and extent of consumer spending. This would be similar to the development in the twenties when the improvement of the automobile, and the development of all of the products and services associated with it, resulted in a shift in the level of consumption. In fact, the ratio of savings of individuals to their disposable income was reduced from an annual average of 16 per cent, in the period 1910–20, to 9 per cent in the period from 1921 to 1940.

A lifting of the expenditure line might also arise by the marketing of existing products in a cheaper and more attractive form. Examples of this would be lower-priced automobiles or low-cost houses which would broaden the markets in the low income brackets. Finally, the savings-income pattern can be altered materially through government policy with respect to social security and tax policies.

These considerations point up the uncertainties involved in the prospects for retail trade in the post-war years. The dominant factors will be the volume of consumer incomes and of employment which will prevail. Past experience indicates the magnitude of the change in sales to be expected with a change in disposable income. In the absence of new developments tending to alter the savings-income pattern, the past relationship should prove a helpful guide in determining the level of expenditures corresponding to a given level of disposable income.

QUESTIONS

1. What relationship does *price* elasticity of demand bear to *income* elasticity of demand?
2. From the point of view of the individual merchant setting a price on a particular commodity, what significance have changes in consumer income?
3. To what extent could a nation-wide chain-store system base sales forecasts on consumer income prospects?
4. What accounts for changes in the *level* of income-expenditure relationships such as occurred between 1910–20 and 1921–40?
5. Do changes in dollar sales accurately represent changes in physical volume of sales? What factors might cause discrepancies between these two series?

APPENDIX TO CASE II-8

CONSUMER EXPENDITURE ITEMS CLASSIFIED ACCORDING TO SENSITIVITY TO CHANGES IN THE DISPOSABLE INCOME*

Classification	Insensitive	Somewhat Sensitive	Sensitive
I. Food and tobacco	Purchased meals and beverages—schools Tobacco products and smoking supplies	Food purchased for off-premise consumption Purchased meals and beverages: Retail, service and amusement establishments Hotels Tips Food furnished commercial employees Food produced and consumed on farms	Purchased meals and beverages: Dining cars Institutions, clubs and industrial lunchrooms
II. Clothing, accessories and jewelry	Shoes and other footwear Shoe cleaning and repair Laundering in establishments Costume and dress suit rental Net purchases from second-hand clothing dealers	Clothing and accessories except footwear Cleaning, dyeing, pressing, alteration, storage and repair of garments (in shops) Miscellaneous personal services	Fur storage and repair Dressmakers and seamstresses (not in shops) Jewelry and watches Watch, clock and jewelry repair
III. Personal care	Toilet articles and preparations Barber shop services	Beauty shop services Bath and masseurs	
IV. Housing	Owner-occupied nonfarm dwellings—space-rental value Tenant-occupied nonfarm dwellings—including lodging houses—space rent Rental value of farm houses Clubs, schools and institutions	Transient hotels and tourist cabins	
V. Household operation	Lighting supplies China, glassware, tableware and utensils Net purchases from second-hand furniture and antique dealers Upholstery and furniture repair Fuel except gas and ice Purchased Produced and consumed on farms Household utilities: Electricity Gas Water Telephone Postage Moving expenses and warehousing Fire and theft insurance on personal property—net payments Miscellaneous household operation services	Refrigerators and washing and sewing machines Cleaning and polishing preparations Rug, drapery and mattress cleaning and repair Care of electrical equipment except radios and stoves Stationery and writing supplies Miscellaneous household paper products Telegraph, cable and wireless Express charges	Furniture Floor coverings Miscellaneous electrical appliances except radios Cooking and portable heating equipment, n.e.c. Products of custom establishments, n.e.c. Tools Writing equipment Domestic service excluding practical nurses: Cash payments Value of meals furnished
VI. Medical care and	Ophthalmic products and orthopedic appliances	Drug preparations and sundries	Practical nurses and midwives

(Continued)

Classification	Insensitive	Somewhat Sensitive	Sensitive
death expenses	Physicians Laryngologists and pediatrists Private duty trained nurses Privately controlled hospitals and sanitariums Student fees for medical care Funeral and burial services Cemeteries and crematories	Dentists Osteopathic physicians Chiropractors Miscellaneous curative and healing professions Accident and health insurance—net payments Monuments and tombstones	Net payments to group hospitalization and health associations Mutual accident and sick benefit associations—net payments
VII. Personal business	Private employment agency fees Employees' dues and fees to professional associations Trust services of banks Bank service charges on deposit accounts Bank check collection and foreign exchange charges Safety deposit box rental Money order fees Expense of handling life insurance Life insurance companies Fraternal and assessment associations Legal services	Money expenditures for [illegible] storage, and shipping Classified advertisements Net purchases from pawnbrokers and [illegible] and stores Personal business services	Nonprofit employment agency fees Net payments to labor unions Brokerage charges and interest and investment counseling Interest on personal debt
VIII. Transportation	User-operated transportation Gasoline and oil Bridge, tunnel, ferry, and road tolls Automobile insurance net payment Purchased local transportation Street and electric railway and local bus Steam railways—commutation Ferries—foot passengers Purchased intercity transportation Intercity bus Coastal and inland waterways	User-operated transportation Tires and tubes Automobile repair, greasing, washing, parking, storage and rental Purchased intercity transportation—airline	User-operated transportation New cars Net purchases of used cars Parts and accessories Purchased local transportation Taxicab fares and tips Purchased intercity transportation Steam railway excluding commutation Sleeping and parlor car fares and tips Baggage transfer, carriage storage, and excess baggage Luggage
IX. Recreation	Admissions to specified spectator amusements Motion picture theaters Entertainment of nonprofit organizations except athletics Professional football Professional hockey College football Other amateur spectator sports Purchases of programs Specified commercial participant amusements Daily fee golf courses greens fees Golf instruction, club rental, and caddy fees Informal recreation	Admissions to specified spectator amusements Professional baseball Horse and dog race tracks Specified commercial participant amusements Billiard parlors and bowling alleys Dancing, riding, shooting, skating, and swimming places Amusement devices and parks Sightseeing buses and guides Private flying operations Informal recreation Books and maps Nondurable toys and	Admissions to specified spectator amusements Legitimate theaters and opera [illegible] admission Pari-mutuel net receipts [illegible] receipts minus pay-off Informal recreation Wheel goods, durable toys, and sports equipment Boats Radios, phonographs, parts, and records Pianos and other musical instruments

(Continued)

Classification	Insensitive	Somewhat Sensitive	Sensitive
	Magazines, newspapers, and sheet music Book rentals and repair Hunting-dog purchase and training and sporting-goods services Camp fees Clubs School fraternities—dues and fees Fraternal, patriotic, and women's organizations except [illegible]—dues and fees [illegible]	Sports supplies Boat and bicycle rental, storage and repair Radio repair Photo developing and printing Photographer studios Veterinary service and purchase of pets Clubs Athletic and social—dues and fees Commercial amusements n.e.c.	Collectors' net acquisitions of stamps and coins Flowers, seeds, and potted plants
X. Private education and research	Higher education Elementary and secondary schools Other [illegible] except [illegible]—fees [illegible]	Commercial, business and trade schools—fees Correspondence schools—fees	
XI. Religious and welfare activities	Religious bodies Social welfare and foreign relief agencies Museums and libraries [illegible] except hospitals and research		Political organizations
XII. Foreign travel and remittances	Personal remittances to foreign countries	Other foreign travel expenditures	Payments to United States vessels

* The classification is based on the relationship between consumer expenditures for each item, disposable income and time for the period 1929–40. The insensitive items are those which on the average showed a change of less than 8 per cent for each change of 10 per cent in the disposable income, all other factors remaining constant; the somewhat sensitive items showed changes of between 8 and 12 per cent; and the sensitive items showed changes of more than 12 per cent.

Source: *Survey of Current Business*, Vol. XXV, January 1945, p. 10.

Case II–9: MARSHALL FIELD AND COMPANY

In the spring of 1941, Marshall Field and Company faced a problem of internal competition between the basement division and the upstairs division of its main retail department store in Chicago. This competition caused duplicate investment in inventories, uncertainty of aims within the organization, and confusion among customers of the store. As a result, actual sales of the company fell short of the volume which management believed should be attained.

Marshall Field and Company began business as a retail store in Chicago in 1852. The company grew rapidly and attained a position of national pre-eminence by the turn of the century. A privately controlled corporation, it expanded into manufacturing, wholesaling, and real estate. It also extended retail operations by increasing the number of store units in the Chicago area and elsewhere. Its large

Chicago department store continued, however, to produce a very important part of the firm's total revenues and net profit. Until 1931 the basement division of the Chicago store had accounted for about 25 per cent of the total sales of the store. This share of total store business was well above the national average for department stores.

During the decade 1930–40 important changes took place in department-store retailing, and these changes had their effect on the operations of Marshall Field and Company. A primary factor was the progressive decline in the general price level after 1920, a movement which was accelerated by the business depression beginning in 1929. This decline was reflected also in retail prices, as is shown in Exhibit I. Technical as well as cyclical factors contributed to the general price decline. In 1921, for example, a heavy, crudely styled leather jacket sold for from $25 to $30. By 1941 manufacturers were producing highly styled, precision-tailored jackets, with

Exhibit I

COST OF GOODS PURCHASED BY WAGE EARNERS AND LOWER-SALARIED WORKERS IN THIRTY-FOUR LARGE CITIES, 1920–40, NATIONAL INCOME, UNITED STATES, 1929–40

(1935–39 = 100)

Year	All Items	Clothing	House Furnishings	National Income (Million Dollars)
1920	143.2	201.0	164.6	
1921	127.7	154.8	138.5	
1922	119.7	125.6	117.5	...
1923	121.9	125.9	126.1	...
1924	122.2	124.9	124.0	...
1925	125.4	122.4	121.5	...
1926	126.4	120.6	118.8	...
1927	124.0	118.3	115.9	...
1928	122.6	116.5	113.1	
1929	122.5	115.3	111.7	$83,326
1930	119.4	112.7	108.9	68,858
1931	108.7	102.6	98.0	54,479
1932	97.6	90.8	85.4	39,963
1933	92.4	87.9	84.2	42,322
1934	95.7	96.1	92.8	49,455
1935	98.1	96.8	94.8	55,719
1936	99.1	97.6	96.3	64,924
1937	102.7	102.8	104.3	71,513
1938	100.8	102.2	103.3	64,200
1939	99.4	100.5	101.3	70,829
1940	100.2	101.7	100.5	77,809

Source: Statistical Abstract of the United States dress-clothing refinements, in a wide variety of high-quality leathers, to retail at $10. As another example, in 1921 a man's light-weight wool sweater for sportswear retailed at $10. By 1941, through economies of mass production, sports sweaters of equal quality retailed at $5. This qualitative improvement was not generally reflected in statistical measures such as those shown in Exhibit 1. A second factor changing the distributive position of the department store was a marked decline, after 1929, in consumer incomes. More than a decade later the level of incomes was still below that of 1929. Retail customers with less money insisted on low-priced merchandise.

As a result of the foregoing changes, the structure of retail trade was believed by many marketing experts to have shifted substantially over the ten years preceding 1940. Department stores found it difficult to maintain sales volume through the traditional methods of operation, and relatively low-cost distributors made inroads into the department-store market. Among the latter, mail-order houses which had opened retail-store units began making important competitive advances and were attracting from established department stores many customers, especially those who bought low-priced merchandise. Conventional department stores began to place more emphasis on goods bought by the middle- and lower-middle-income groups. Marshall Field and Company was one of the last stores in the country to be affected by these changes, largely because the upstairs divisions of the Chicago store had developed an extensive following in the finest lines of domestic and imported merchandise. Despite its loyal clientele, however, the store felt under pressure to compete for business in the lower-priced lines.

Prior to 1930 the Chicago store of Marshall Field and Company had divided its retail market between upstairs and basement divisions. Under this policy the price lines of the basement division had gone up to a certain point and the price lines of the upstairs division generally began at a point a little above where the basement store left off. This was particularly evident in price lines which were featured in newspaper advertising.

With the decline in prices and with other changes in the structure of retail trade, the upstairs divisions after 1930 began competing more and more directly with the basement division. The upstairs and basement divisions soon found themselves making two bids for the same group of customers. This resulted in duplicate invest-

Exhibit 2

SALES OF MARSHALL FIELD AND COMPANY, AND OF SEARS ROEBUCK AND COMPANY, 1930-40

Year	Marshall Field Total Operating Revenue	Basement Sales as Per Cent of Total Store Sales, All Large Stores*	Sears Roebuck Sales
1930	$150,698,967	†	$390,382,107
1931	114,318,692	15.4	347,200,054
1932	78,267,829	16.0	280,061,229
1933	90,415,699	17.4	274,707,651
1934	102,623,568	20.6	273,240,494
1935	110,810,658‡	19.4	318,060,563
1936	106,135,693	18.9	392,097,720
1937	100,044,813	18.5	494,968,022
1938	82,270,916§	18.4	537,242,103
1939	86,774,921	†	501,676,644
1940	92,773,220	18.4	617,414,267

* Based on department stores with annual sales volumes in excess of $[illegible] reporting to National Retail Dry Goods Association.
† Not reported.
‡ The wholesale division, which accounted for $[illegible] in annual volume, was abandoned in November 1935.
§ Departments in the [illegible] volume [illegible] closed.
Sources: Marshall Field and Company sales from company's annual reports; Basement sales from National Retail Dry Goods Association, *Departmental Merchandising and Operating Results 1937* [illegible]; Sears Roebuck sales from Moody's *Industrials*.

ments in inventory, in the maintenance of two buying organizations which were shopping the same wholesale markets, and in other undesirable forms of duplication and competition. The outcome of this competition was that the upper-floor sections became much more important in the moderate-price field and took a large amount of sales volume out of the basement division.

In order to recover sales losses caused by the competitive situation within the company, the basement division gradually began to put more and more emphasis on a highly promotional type of business, which minimized the importance of regular lines and which put a premium on sale goods. As a result the basement division planned and executed huge special sales such as the annual "May Celebration," the "Harvest Festival," and the "Twin Dollar Days." These basement-wide sales brought in immediate sales volume, but this business came mainly from customers who followed special sales events and who bought only when a sale price was being offered. Very few of them became regular customers of any one store.

The results of this type of promotional effort, which was so foreign to the old way of operating, were particularly evident as the nation was coming out of the depression in the late thirties. Increases in sales volume of the basement division remained below those of moderate-priced stores throughout the country. There was, therefore, a constant drive each year to make promotions larger in order to increase sales volume over the year before. As each year's sales budgets were being planned, however, there could never be any reliance on cumulative business because of the nature of the previous year's promotional sales volume. Each year was an effort made on a short-run appeal and designed to bring in immediate sales and not to develop consumer response which had lasting, long-run value. Each year's sales volume had to be produced by increased advertising expenditures or by high-pressure sales methods. This, in turn, raised new problems in the form of dangerously low mark-up on the goods offered for sale, greatly increased operating costs, and complicated personnel problems caused by the thousands of extra salespeople who had to be brought in from time to time to conduct these great sales. These promotions caused such variation in sales volume between the days of the week that efficiency and economy of operation had to be sacrificed. Fourteen or fifteen times during the year, it was common to find Monday's sales running four and five times heavier than those of the next day, Tuesday.

Thus, in the spring of 1941, Marshall Field and Company faced four alternatives with regard to maintenance of an adequate volume of retail sales in its Chicago store:

1. Continuance of the promotional operation in the basement, with a concerted attempt to reduce expense by leveling out fluctuations in daily and seasonal sales. This course appealed to management because of the advantage there would be in having the basement carry a large share of total store overhead.
2. Conversion of the basement division into a bargain basement, such as that operated by the E. A. Filene Company of Boston. If this plan were followed, upstairs stocks could be cleared into the basement, where prices would be drastically cut on an automatic turnover basis. The basement would be known as a cut-rate operation. Under this plan it was expected that sales volume would decline by 50 per cent. This course, however, would have the advantage of reducing competition with the upstairs store, thereby permitting a considerable reduction in investment and inventory and in the size of the organization.
3. Abandonment of the basement division and use of the space

for expansion of the housewares and appliances departments. This policy had been followed by R. H. Macy and Company of New York.

4. Reorientation of the merchandising policy of the basement division so as to cover the low-price ranges on terms which would be directly competitive with other low-priced department-store and chain-store competitors. At the same time, some more or less regular sharing of the retail market by upstairs and basement divisions could be reinstituted. Some members of the management believed that the increase in national income in 1940 indicated this alternative as the soundest policy for the company.

QUESTIONS

1. What effect did changes in consumer income, after 1930, have on the demand for goods sold by department stores? On the demand for goods sold in Marshall Field's basement store? In the upstairs store?
2. What was the effect of the basement division's promotional policy, after 1930, on the demand for its goods? On the demand for goods of the upstairs divisions?
3. Evaluate the effects on total store demand of each of the four policies proposed in the spring of 1941.
4. Which policy would produce the greatest total revenue for the store?

Forecasting Demand

Case II-10: HOW CAN BUSINESS ANALYZE ITS MARKETS?

The following excerpts are taken from an article by Louis J. Paradiso in the *Survey of Current Business*.[1] The simplified correlation approach presented in this article is useful in forecasting sales.

There is no single method or certain technique available for analyzing the markets and their future tendencies. Most approaches to marketing analysis aim to measure by statistical devices the effect of various economic factors on the markets. But along with the statistical and economic results must be brought to bear on the problems the judgment of the businessman, backed by his intimate knowledge of his own field, and by his personal experience with the ways in which the numerous special factors interact upon and affect his operations and results.

IMPORTANCE OF GENERAL FACTORS

The businessman, however, cannot brush aside the powerful action of the general economic forces which permeate all business activities and which set the tone for all individual business operations. He must be in a position to evaluate the impact of these forces upon his own particular business, on his costs, on his investments, on his profits, so that his decisions may be guided adequately. He must be ready to extend and apply these analyses to his own firm and modify them if necessary on the basis of his individual experience.

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[1] Vol. XXV (March, 1945), pp. 6–13.

It is the purpose of this article to describe a method of marketing analysis which the businessman can apply to the operations of his own particular industry or firm. . . .

The businessman will find that he needs little or no technical background to adapt the methods illustrated to his own sphere of operation and with a knowledge of this technique he will have on hand a ready tool for judging very quickly the effect of major economic forces on his sales, profits, costs and other factors pertaining to his business.

GUIDES TO ANALYSIS OF MARKET

The method which will be described . . . is known to technicians as that of correlation analysis. In the laymen's language this is simply a procedure for summarizing the experience of the past for the purpose of arriving at a statement of its implications for the future.

The businessman is frequently not interested in the past except as it throws light on current and future operations and policies. By analyzing the experience of his firm or industry as it was affected by the economic forces over a period of widely varying business conditions, such as that from 1929 to 1944, he will have a more adequate foundation upon which to build and to plan his future operations.

The method is illustrated graphically in a very simple fashion in Exhibit 1. The problem in this case is to see how the aggregate sales of manufacturing firms are related to their combined profits before tax deductions. Each point on the chart indicates the level of profits and sales for the specified year. For example, in 1933 sales amounted to 30.6 billion dollars while profits in that year were about 420 million dollars. The point for 1933 on the chart is located by means of these two magnitudes. The other points are similarly located.

It will be noticed that for the period 1929–43 as sales increased or decreased, profits also went up or down in a manner so that they tend (for the years before our entry into the war) to lie along a straight line. The line shown in the chart can be obtained in two ways. It can be drawn by inspection in such a way that it represents the line of "best fit" for the points, i.e., the line that best represents the pattern of points. It can also be obtained by a formal statistical procedure, known as the method of least squares.[2]

Specifically the relationship indicates that when sales change by 10

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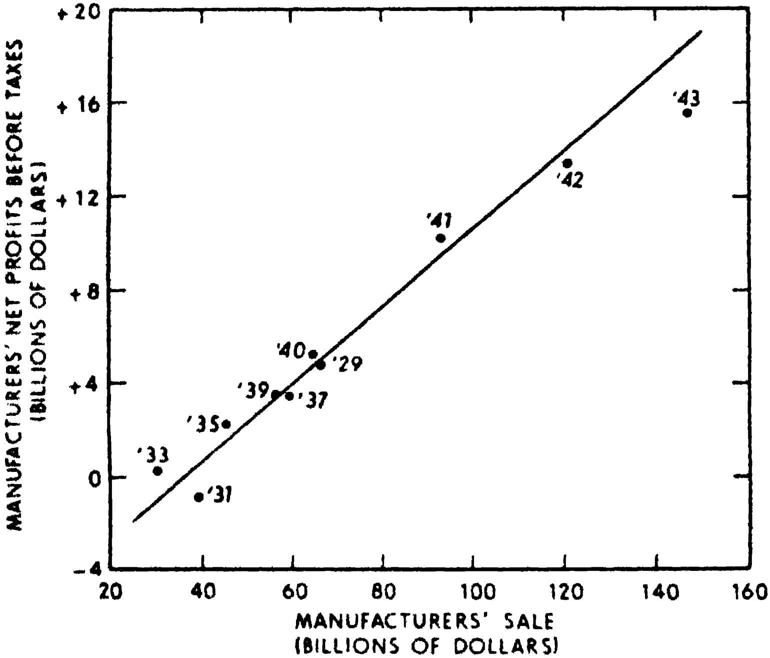
[2] For those who are interested in the regression or formula for the line obtained by the method of least squares for the years 1929–41 it is as follows: Profits (billions of dollars) $= -6.135 + 0.171 \times$ sales (billions of dollars). Most elementary textbooks on statistics describe the method of "least squares," for example, see Croxton and Cowden, *Applied General Statistics* (New York: Prentice-Hall, Inc., 1942).

Exhibit 1

RELATION OF MANUFACTURERS' NET PROFITS BEFORE TAXES TO SALES*



* Note: Net profits before taxes represent corporate and noncorporate profits. Line of regression fitted to data for selected years, 1929-43.

billion dollars, profits change by 1.7 billion dollars. In other words, the change in profits before taxes constitutes 17 per cent of the change in sales of all manufacturing firms. This conclusion applies to the totality of manufacturing firms. The percentage would be more for some firms and less for others.

BASIC STEPS IN THE ANALYSIS

This example embodies many of the problems inherent in this type of analysis. In general, there are five basic steps to be considered in the study of markets by the use of relationship analysis.

1. *The Element to Be Analyzed.* The first step is the selection of the element or item to be analyzed. The businessman may be interested in such items as sales, profits, production, prices, costs, and investments. An important consideration is whether the item is to be analyzed as a total or whether a separate analysis should be made of its parts. For example,

in the analysis of clothing sales it may prove more fruitful to consider separately women's clothing, men's clothing and children's garments. In most cases this decision can be made on the basis of experience.

2. *Selection of Related Factors* The second step consists in selecting the major factors which directly or indirectly cause changes in the item to be analyzed. This is perhaps the most important consideration of the analysis and requires expert knowledge of the business as well as good judgment.

In selecting the major factors the businessman will have to answer many questions. Does industrial activity have any direct or indirect effect on changes in the item to be analyzed? Or, is the more important factor the incomes of consumers? Is it construction activity? Or is it the cash farm income? What part do changes in prices or wage rates, or labor efficiency play? All of the major factors that influence the fluctuations in the item must be considered and weighed as to their importance in affecting the course of the item under consideration.

The businessman knows that there are many factors, sometimes running into the hundreds, that affect his sales or profits or the other elements of his business. Some of these play a major role while others are of minor importance. However, underlying the fluctuations in the items are the broad economic factors which synthesize the effects of the numerous specific factors and which can be used by proxy to represent their combined effects.

In general, therefore, one or two, or at most three factors are usually sufficient to explain most of the variations in the item. For example, if the problem is to determine the factors influencing the price of butter, it is a simple matter to list a dozen factors, such as production of butter, its stocks, imports, exports, prices of competing fats, etc., all of which affect the price of butter to a greater or lesser degree. However, the analysis is much more useful if it can be resolved in terms of few dominant factors which account for most of the fluctuations in the price.

The most important consideration in this respect is that the factors finally decided upon must be as nearly *causally* related to the item as possible and must in any event be logically related. Many spurious analyses have been made and many forecasts have gone sour because this condition was not satisfied.

Analyses are often illogical because of the inappropriate choice of factors. For example, a very close correlation has been used by business statisticians between the total volume of freight traffic expressed in ton-miles and the national income in dollars in the past 15 years. That is, whenever the national income increased, freight traffic also rose, and conversely. Yet, despite the close agreement in the fluctuations between these two series, the relation is not a logical one since a physical series has been related to a dollar series.

To see that the relation is not logical, let us suppose that the production of the Nation remained exactly the same in volume and composition from one year to the next but that prices of all goods and services increased by a given percentage. As a consequence the national income would increase. It would then be concluded from the relationship that the physical volume of freight traffic would also increase, which is contrary to the assumption.

A logical relationship would be one between revenues from freight traffic and the national income, or between the volume of freight traffic and the physical volume of national production.

3. *Nature of the Relationships.* Having decided on the factors that bear on the problem, the next step consists of *determining on the basis of past experience the relation or the connection between the item to be analyzed and the major factors influencing its fluctuations.* There are many ways of determining the relations, but the techniques can be classified into two major types—numerical methods and graphical methods.

In general, the graphical method is the most satisfactory and, for most businessmen, the easiest to understand. Exhibit 1 illustrates its application in its simplest form. The method, however, has many advantages and some disadvantages.

When more than one factor is involved in the relation, considerable experience is required in the proper use of the graphical method. Also there can be a great deal of subjective judgment involved in establishing the relationship. However, no other technique can throw as much light on the nature of the relationship and no marketing analysis should be undertaken without using the graphical approach.

The numerical techniques of correlation analysis are conditioned in part by the subjective selection of the general formula to be used to express the relationship. For example, one analyst may decide on the use of a straight line while another will select a general curve. Usually, however, the pattern of the points on the chart and a knowledge of the situation will suggest the nature of the relationship. But a clear knowledge of the problem and the industry is most essential in making the final decision.

The advantage of the numerical approach is that once the general formula is decided upon any analyst will be able to arrive at the same specific formula from the data by the use of definite mathematical rules.

As far as the businessman is concerned, it is not necessary for him to learn any complicated statistical methods. All he needs for most purposes is a simple graph such as that shown in Exhibit 1. If he is interested in deriving a numerical expression of the relationship he can have it done by a technician, or the statistical department of a university or a research agency specializing in such work.

4. *Continuity in the Relationships.* The next step is the consideration of the *continuity in the relationship* between the factors and the item being considered. Of special concern to the businessman is the question of whether or not he can use the relation which existed in the past to anticipate the future. Will the same relation continue in the future? No one can give a definite answer to this question.

In most cases, where the relation is projected into the future it can be assumed that the continuity will be preserved. Usually a relationship which has held for a long period of years covering depressions and prosperity under different political and social conditions will continue to hold in the future. And an informed estimate based on the past experience through the use of this type of analysis is certainly much better than a guess based on hunches or on a mass of uncorrelated information.

Arguments, however, have been set forth against this assumption of continuity. But the general validity of continuity in economic activities is being more widely accepted and certainly underlies all planning done by individuals and corporations.

The continuity assumption implies that consumer buying habits do not deviate radically from the pattern of the past, that the income distribution is not materially altered, that businessmen's ways of operating do not undergo sudden and marked changes, that technological innovations are not too abrupt and drastic and that no cataclysmic event (such as war) occurs to disrupt the general structure and operations of the economy.

A simple example will make clear the application of continuity to market analysis. Suppose that on the basis of 20 years experience a small manufacturer of a special steel product found that his sales conformed with the fluctuations in general industrial activity, so that when the latter increased or decreased by 10 per cent his sales went up or down by 15 per cent. He would like to use this information as a basis for future policy decisions.

But even though he has had 20 years of confirmation of this basic relation he must assume the continuity of the relation in the future. He could not and would not use this fact if he knew, for example, that his customers were going to use substitutes for his product. He obviously would make allowance for this special factor in his calculations.

And it is at this very point where the businessman's judgment, experience and intimate knowledge of his field would enable him to make the necessary adjustments to the results obtained on the basis of past experience. In other words the assumption of continuity does not deny the possibility of discontinuities but is used until there is evidence to the contrary.[3]

5. *The Error of Forecast.* Finally, account must be taken of the *probable error of a forecast* which is based on the use of the relationship. The error may arise from two sources.

First, estimating an item from a relationship to other factors requires that forecasts be made of these other factors. These forecasts will usually contain errors which will be transmitted to the item that is calculated from them. For example, suppose that a relationship is established between the level of inventories held by a business firm and the volume of production of that firm. It is required to determine the volume of inventories corresponding to a forecast of production. Obviously, if the production forecast is in error, the inventory estimate made from the relation will also be in error.

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[3] For an empirical method of testing the continuity of relationships see National Resources Committee, *Patterns of Resource Use* (Washington, D.C., Government Printing Office, 1938). The method stated briefly is as follows. The relationship was determined for the period not including the three or four most recent years for which the data were available. The continuity of the relationship was then tested for the years which were omitted from the relationship by comparing the values calculated from the formula with the actual values in the subsequent years. The test was positive if the error in these years was within the range of errors obtained in past period from which the formula was developed.

A second source of error arises from the "fit" of the relationship. In the period from which it was determined, the value of the item as calculated from the relation differs from the actual value by an amount which is called the error of estimate. For example, in Exhibit 1, the calculated profits obtained from the line for 1939 is \$3.6 billion. This compares with the actual profits in that year of \$3.5 billion and represents an error of \$0.1 billion or a percentage error of 3 per cent when compared with the calculated figure.

The average percentage error for the entire period considered is a rough and ready guide to the probable range of error that may be expected in forecasting from a relationship, assuming that it continues to hold in the future. In other words, the likelihood that an error falls outside the range of the average error is fairly small.

Thus in all business forecasting from relationships allowance must be made for these two sources of error and the results, therefore must be expressed as a range within which the actual values are likely to fall.

This method of analysis is for most purposes far superior to the more common procedures that are applied to marketing problems. The correlation method leads to a more fundamental understanding of the interrelationships in the economy and to a more reliable formulation of these relations. It often brings to light some hitherto unrecognized associations between the item that is being analyzed and the factors to which it is related. As a guide to future trends it serves as a more certain tool of analysis than other techniques.

One of the most common of these other methods is that in which ratios are used such as the inventory-sales ratio or income-sales ratio. In many cases such ratios are not meaningful since the true relation may not be one of direct proportionality. Another method frequently used is to forecast an item from an extension of its trend. This method is in most cases very questionable since it involves little understanding of the forces contributing to the short-term fluctuations of the item.

QUESTIONS

1. By use of the simplified graphic technique of correlation, determine one important relationship between a significant variable (such as consumer income, bank clearings, building contracts, etc.) and the sales of a selected product. Data for this purpose can be derived from a recent issue of the *Survey of Current Business*.

2. What reasons are there for believing that the variable you have used actually does determine sales of the product in question? What other variables might also influence sales?
3. To what extent will currently available data for the variable foreshadow future sales?
4. What, specifically, is the average percentage of error of your forecast?

Case II-11. LARSON AND WOLF, INC.

Henry Wolf, son of the former owner of Larson and Wolf, Inc., a retail jewelry store, returned from military service in the fall of 1945. At that time he was considering two alternative business opportunities for himself. The first was an offer from a manufacturing jeweler in an East Coast city. The firm wished Mr. Wolf to assume the duties of vice-president in charge of sales at a starting salary of $8,500. The second alternative was entering business on his own through purchase of the Larson and Wolf jewelry store.

Larson and Wolf, Inc., was situated in a thriving mid-western industrial city of about 100,000 population. The firm had been founded in 1910 by Henry Wolf, Sr., and a partner, George Larson. By the end of World War I the store had an established clientele among the middle- and upper-income groups. The business had been energetically but conservatively managed. In 1924 Wolf, Sr., acquired his partner's interest, who thereupon retired from the jewelry business. Under Mr. Wolf's management the store continued to enjoy increasing sales volume and good profits. As the main retail shopping center migrated uptown in the late twenties, Larson and Wolf planned to follow, but in 1929 the downturn in business adversely affected retail sales of jewelry, and Mr. Wolf deferred moving to a new location.

In 1933 Henry Wolf, Jr., graduated from college, where he had made a creditable record in the study of marketing. Immediately he went to work in the family jewelry store, which, after several lean years, was beginning to feel the upturn of business activity which started in the spring of 1933. After two years of diligent effort in all phases of store work, Henry, Jr., through a business connection of his father's, went to New York, where he worked for a manufacturing jeweler in the production department and later in the sales division.

Henry Wolf, Sr., died in the spring of 1941, leaving the business jointly to his widow and to his son, Henry, Jr. It was decided that the business should be sold, since there was a purchaser who had on several previous occasions attempted to buy the Larson and Wolf Company. The jewelry store was sold to this purchaser, a middle-aged man of considerable experience in the retail jewelry trade. The successor owner was regarded as a sound buyer and manager but was not thought to have much ability in sales promotion. He was also limited in capital resources.

When the purchaser's health failed in 1945, he communicated with Henry Wolf, Jr., who at that time was serving in the United States Army, offering to resell the business on very advantageous terms. Negotiations were still being carried on in the fall of 1945, when Wolf received an honorable discharge from the armed forces.

As he reviewed the alternative business ventures, Wolf anticipated that, should he accept the post of vice-president of the manufacturing jewelry concern, he would average $10,000 annually in salary during the first five years. It seemed unlikely that he would be taken in as a member of the firm because it was a closely held family corporation. Were he to purchase the Larson and Wolf Company he believed he could raise the sales volume by at least 20 per cent over the next five years. This, he thought, was a reasonable estimate, because his youth and wide personal acquaintance in his home town would place him at a great advantage over his competitors, the chief of whom was a branch store of a regional chain with headquarters in Chicago. Wolf believed, also, that a shift of store location, contemplated in 1929 but never carried out, would compensate for any downtrend which might be experienced as the result of a postwar recession. If sales volume attained the level of $100,000 annually over the next five years, Wolf reasoned that he could net $15,000 as salary and profit.

In reviewing trade papers Mr. Wolf noticed that it was freely predicted that the heavy wartime excise taxes on jewelry would be lowered or repealed. Trade sources also indicated that lower-priced merchandise would be generally available by late summer of 1946. Moreover, Wolf was aware of the tremendous backlog of savings created by the unavailability of many consumer goods during the war, and he believed that this would stimulate jewelry sales in the postwar period. At this time the article reproduced in the appendix came to Mr. Wolf's attention.

Sales of Larson and Wolf, Inc., from 1929 to 1944 were as follows:

1929	$59,555	1937	$38,633	1941	$65,222
1933	19,760	1938	33,225	1942	68,617
1935	26,110	1939	30,219	1943	72,300
1936	33,102	1940	37,313	1944	76,004

QUESTIONS

1. What factors chiefly influence the national volume of jewelry sales?
2. What estimate of sales volume should Henry Wolf adopt in deciding between the two business alternatives?

APPENDIX TO CASE II 11

THE OUTLOOK FOR POSTWAR SALES OF JEWELRY[1]

With the favorable events on the military fronts it is natural for jewelers at this time to be wondering about the sales prospects in the postwar period. In order to make an intelligent appraisal of the prospects for jewelry store sales it is necessary to determine what are the major economic factors affecting the fluctuations in sales.

Every jeweler knows that the most important factor affecting sales for the trade as a whole is the general condition of business. In good times sales and profits are high while in depressed periods they drop to unfavorable levels. Of course, the ability, location and capital of the individual retailer partly determines how the ups and downs of general business affect him personally. However, for the total jewelry trade sales volumes are conditioned by the general level of prosperity.

Since this is a problem concerning the demand for a consumer good the most important factor affecting the volume of dollar sales is the income of consumers which in turn is dependent on the course of general business activity.

A comparison of the data shown in Exhibit 1 on sales of jewelry stores and consumer income for the past 15-year period from 1929 to 1944,

Exhibit 1

SALES OF RETAIL JEWELRY STORES AND CONSUMER INCOMES

Year	Sales of Jewelry Stores Millions of Dollars	Disposable Income of Individuals Billions of Dollars *	Year	Sales of Jewelry Stores Millions of Dollars	Disposable Income of Individuals Billions of Dollars *
1929	536	$79.6	1939	362	$ 67.7
1933	175	44.5	1940	426	72.9
1935	235	56.3	1941	587	88.7
1936	297	65.2	1942	753	110.4
1937	317	69.2	1943	964	124.2
1938	290	62.9	1944	1,002	137.5

* Note Represents income payments less tax payments

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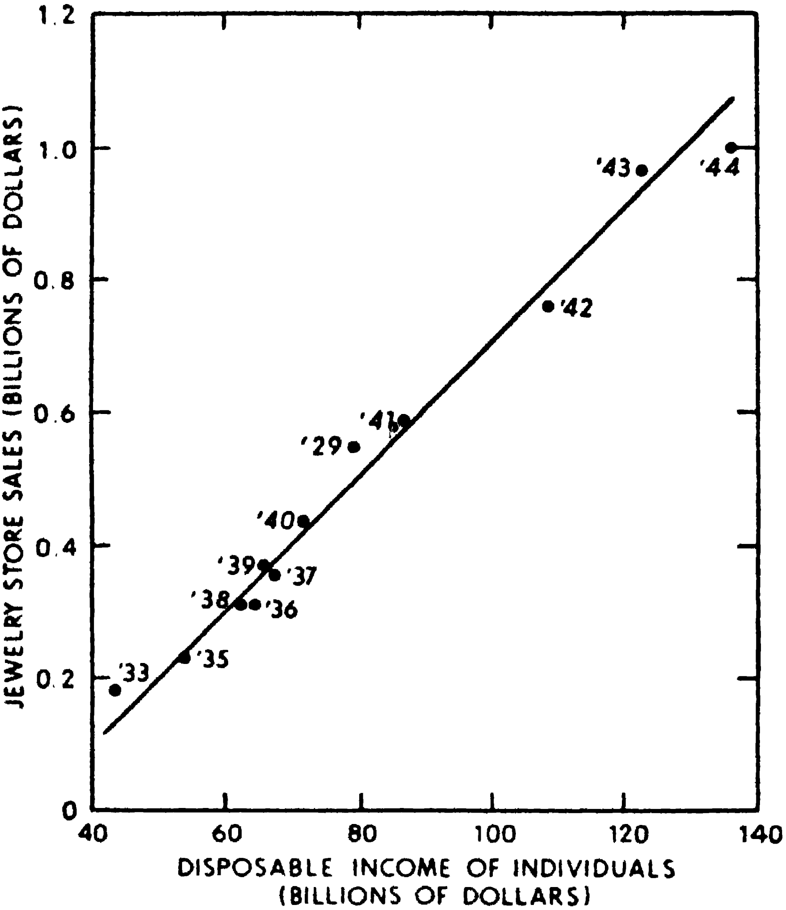
[1] Excerpts from a report published by the U.S. Department of Commerce, *Survey of Current Business*, March, 1945.

Exhibit 2

RELATION OF JEWELRY STORE SALES TO CONSUMER INCOME



indicates that sales went up and down as the incomes increased or decreased. This is clearly brought out in Exhibit 2 which shows the relation between sales of jewelry stores and the disposable income of individuals. The disposable income is the income left to individuals after payment of taxes.

The striking fact in this exhibit is that sales and incomes are intimately related according to a definite pattern. The points tend to fall very closely along a straight line. The line shown in the exhibit, represents the relationship and was computed by statistical methods. Essentially the same line, however, can be drawn in by inspection.[5]

The average percentage deviation or error of the actual sales from the corresponding sales as calculated from the straight line for the entire period from 1929 to 1944 is only 5 percent indicating that sales have been almost completely determined by the changes in consumer income. Furthermore, more important from the point of view of post-war considerations, sales in the war years were not out of line from the pre-war relation. In other words, the tremendous wartime expansion in sales kept pace with expanding incomes in about the same way as would be expected on the basis of the pre-war experience.

Another striking point shown by the relation is that sales of jewelry stores are very sensitive to changes in consumer income. For example, from 1933 to 1937 consumer incomes increased by 55 percent, whereas jewelry store sales increased by 100 percent, or almost double the relative increase in income. In general, on the basis of this past relation it can be shown that on the average a change of 10 percent in disposable income was associated with nearly a 20 percent change in sales.

This is an important conclusion for the post-war business of jewelers. It means that when consumer income is high and increasing, jewelry stores will gain tremendously since their sales increase in greater proportion to the rise in income.

On the other hand, jewelers are at a disadvantage relative to other retailers when incomes and employment shrink since their sales drop more precipitously than the relative decline in income. Indeed, as shown in a previous study jewelry stores stand at the top of the list of major retail outlets when classified according to the response in sales to a change in consumer income.

Jewelers will find many uses for these results. A particular jeweler can compare his sales with total sales for the trade. If he finds, for example, that his share of total national business has been in the same proportion over the years, then the conclusions stated above would apply to his case. If, on the other hand, he was doing better or worse than the trade as a whole, then he would modify the results accordingly.

For the total jewelry business, an important application is the appraisal of post-war prospects. The record of the past provides the basis for gauging the probable range of the post-war volume of jewelry store sales. Since sales have been related to income it is necessary to determine the prospects for income. This, of course, cannot be done precisely but a probable range may serve as a guide.

If there is relatively full employment after the war the disposable income of consumers is estimated at approximately 130 billion dollars at

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[5] The formula representing the line on the exhibit is given by: Sales of jewelry stores (in millions of dollars) = − 388 + 10 × disposable income (in billions of dollars). This implies that whenever consumer incomes change by $10 billion, sales of jewelry stores can be expected to change by $100 million.

Exhibit 3

POSTWAR SALES OF JEWELRY STORES IN RELATION TO CONSUMER INCOME

Assumed Disposable Income (Billions of Dollars)	*Estimated Sales of Jewelry Stores* (Millions of Dollars)*	*Assumed Disposable Income (Billions of Dollars)*	*Estimated Sales of Jewelry Stores* (Millions of Dollars)*
100	680	120	880
110	780	130	980

* Since the average percentage error of the formula was 5 per cent, an allowance for a probable error of about this magnitude up or down must be made in these estimates.

the present level of wage and tax rates. Even if this high level is not achieved there is reason to believe that the income would not fall to disastrously low levels.

Deferred demands for consumer and producer goods will be great because of wartime shortages and these will be backed up by a substantial volume of individual savings and business savings which can make them effective. Furthermore, our social insurance system, by providing unemployment insurance and old-age pensions, will act as a brake on declining incomes. Finally, business and government are laying plans for maintaining a high level of economic activity after the war. This suggests that a business firm can figure limits of, say, from 100 billion dollars to 130 billion, for purposes of calculating possibilities, and use its own forecasting to fix the probable total.

For jewelers, this range of income can be translated into the corresponding volume of sales on the basis of the relationship shown in Exhibit 3.

. . . .

The conclusion is that jewelers will have good business in the postwar years, provided income is maintained reasonably well.

Part III

COST ANALYSIS

THE TERM "COST" has a variety of meanings. Perhaps the best way to gain an understanding of cost is to consider the uses to which businessmen put cost information. One concerns the determination of income. Another pertains to control of the firm's operations. Cost information is also useful in pricing. And, in government regulation of industry, cost serves as a justification for pricing and other industrial practices.

MEANING OF COST

Income Determination

As it bears on the determination of income, cost is a necessary basis for numerous decisions made by management. Some of these, such as decisions on profit sharing, tax payments, and the declaration of dividends, rely largely on income results of the current period. Other decisions, such as wage increases and plant expansion, are based on the sustained results of several accounting periods. Costs, as used in determining income, appear as part of the accounting statement of profit and loss. They are the aggregate of accounting charges pertaining to a given period and for the entire operations of the firm. Some costs, such as direct labor and materials, offer no difficulty of allocation to the current period. Others, such as outlays on machinery and on research and development, are undertaken not only with a view to present benefits in the current accounting period but for future benefits in subsequent periods. There arises the problem of allocation of these expenses over several time periods, that is, the determination of depreciation and other charges attributable to given fiscal periods. "If the accounting period were increased from the customary year to a decade, most of what is now treated as capital expenditure would become chargeable to income; while if the period were reduced to a day, much of what is now treated as current maintenance would become capital expenditure."[1]

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[1] George O. May, *Improvements in Financial Accounts* (Lecture on the G. Lowes Dickinson Foundation, Graduate School of Business Administration, Harvard Uni-

In the aggregate of charges pertaining to a given accounting period are some which are not intended to contribute to present revenues and others some parts of which *will* contribute to these revenues. The extent of accounting recognition of these charges in any given period depends on the purposes at hand. For tax calculations depreciation may be charged off at the maximum permissible rate in order to reduce taxable income. For general financial reporting a slower rate of depreciation may be appropriate. Thus, even in the well-defined area of income accounting, the meaning of costs depends somewhat on the uses to which they are to be put.

Control

A different type of cost information is required for purposes of control of the firm's operations. Here the problem is that of isolating the particular costs bearing on that segment of the firm's operations in which the controller's interest centers. This may be a department, a process, a product, or other cost "center." How to reduce costs of certain operations, whether to adopt a new technique, what sales channels to use—these are decisions in which cost information of a specific sort can be useful. In dealing with these issues, the focus of the businessman's interest is frequently the cost of producing or selling a *unit* of product. Cost accounting, as distinguished from financial accounting, develops cost information related to the production and distribution of *each unit* of product. To the direct costs, such as labor and materials, associated with each unit of product are added prorated amounts of overhead burden—representing the general charges for indirect labor, depreciation, taxes, maintenance, and such other items as are not directly traceable to the unit of product. This gives the "actual" unit costs of making and selling the product. However, since a fluctuation in the volume of production would result in greater or less *per unit* charge for overhead, a rise or fall in unit costs under this scheme is not necessarily attributable to greater or less efficiency of plant management. To impound the effect of changing volume of production on unit costs, accountants have devised *standard cost* systems which establish normal or standard amounts of overhead to be charged against each unit of product.[2] If actual production exceeds or falls short of this standard

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versity) (April 12-14, 1937), p. 4, quoted in Conference on Price Research, *Cost Behavior and Price Policy* (New York: National Bureau of Economic Research, 1943), p. 21.

[2] Standard cost systems also establish standard charges for variable costs, such

volume, the resulting difference between actual and standard costs is carried directly to a "variance" account (which is closed periodically to the profit and loss account). But the standard unit cost remains unchanged by variation in output. It constitutes a yardstick by which management measures the internal efficiency of performance.

Pricing

A third use of cost analysis relates to pricing. Obviously, the aggregate costs shown on the statement of profit and loss afford little direct assistance in setting prices for a company's products. This is especially true where numerous lines and conditions of sale are involved. Unit costs determined by cost accountants come closer to the mark. There are many situations, however, in which businessmen are forced to abandon accounting costs and to determine prices by other methods. In general, the cost information needed for pricing is distinctly different from that required for income determination or for internal management control. "Future costs, not current or past costs, are relevant for most price policy decisions." "The businessman is interested in the costs which *will be incurred*, those which lie ahead . . . not those which have already been incurred, those to which the business is already committed."[6] These requirements have led accountants to modify formal cost accounting information in the direction of determining the additional or incremental costs involved in certain pricing decisions. These methods, while they have to do with the accounting records of the company, embody some of the concepts of cost employed by economists, especially the marginal-cost concept. It is in the field of cost determination and pricing that economic analysis can make one of the greatest contributions to business practice. The economic analysis of cost will be discussed further below.

Government Regulation

Finally, the growth of government regulation of industry has led to an increased use of cost information to justify prices and rates

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as labor and materials. Departures of actual unit variable cost from standards are usually attributable to causes other than variation in volume of production.

[5] Joel Dean, "Cost Forecasting and Price Policy," *Journal of Marketing*, Vol. XIII (January, 1949), p. 279.

[6] Malcolm P. McNair and Richard S. Meriam, *Problems in Business Economics* (New York: McGraw-Hill Book Co., Inc., 1941), p. 167.

presented to regulatory bodies. Business firms have also found it necessary and desirable to justify their action on the basis of cost under N.R.A. codes, under the Fair Trade Acts, and under the Robinson-Patman Act. The "precise and final appeal" of costs as something absolute has tended to obscure the subtle functional relationships of cost and other variables. But "an appeal to costs (a supposedly unprejudiced piece of evidence) may frequently serve the useful purpose of justifying a policy or action."[5]

ECONOMIC ANALYSIS OF COST

Accounting versus Economic Concepts of Cost

Enough has been said regarding the uses of cost information to indicate that several distinct concepts are involved. These differences in point of view are significant in the case of accountants and economists.

> One must recognize a distinction between: the concepts and conventions of those who contribute actively to such managerial decisions as pricing, calculation of income and tax determination, and the intellectual constructs of those who attempt to describe, explain or appraise the process and results of these decisions, particularly for the economic system as a whole. The former are primarily the working rules and habits of thought of the accounting profession; the latter are the attributes of economists. Reflecting these differences in objectives, accounting practices are influenced by the accepted rules of income statements and balance sheets, by managerial convenience, and by the expense of accounting records, whereas economic concepts ordinarily presume rather simplified situations conducive to logical elegance.[6]

Accountants are chiefly interested in the historical record of expenses which have been incurred. The needs of financial accounting require that expenses be treated in a uniform and consistent manner from one period to the next. To facilitate comparability, both for different time periods in the same enterprise and for the same period among different enterprises, accountants have developed conventions which attempt to assure similar handling of accounting items. Accountants also insist that *all* the expenses of a firm for a given time period be entered in the profit and loss statement. Moreover, only those costs which represent an outflow of company resources identifiable in monetary terms are properly included in the company's financial statement. Imputed charges, such as interest on owned capital, do not constitute costs for the accountant. Although the context of the foregoing statements is that of financial accounting, the same principles are evident in cost accounting.

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[5] Conference on Price Research, *op. cit.*, p. 27.
[6] *Ibid.*, p. 12.

The economist, by contrast, is not primarily concerned with historical costs. These interest him only as they throw light on the costs which will probably prevail in the future. Nor does he necessarily include in his list of costs all those recognized by accountants. Unlike the accountant, he does not start with a given quantum of costs which is to be divided among the units of product produced by a firm. Instead, he looks on costs as the resistances to further production. Real costs to the economists are those which must be incurred in order to get the factors of production (such as labor or machinery) to make a product or to keep a factor at its present employment (as distinguished from inducing it initially to begin producing). Thus costs are relative to the conditions under which production is carried on. In the short period when plant and equipment and management are available but happen not to be fully occupied, as in an off-season lull, the significant costs of producing may be only the additional labor and materials required for the product. Or, if the labor force would in any event be retained to keep the organization intact, labor, at least up to the required minimum work week, may not be an economic cost. The essence of the economist's position is that he is trying to discover those costs—and only those—without which production (or selling) would not take place.

Cost Functions

In order to find the costs relevant to the production of a given output, the economist employs certain functional relationships which indicate why and how costs change. He deals with simplified logical models which concentrate attention on a limited number of determinants of costs. The chief of these are: the rate of utilization of plant and equipment, the size of the firm, the prices of factors (machines, labor, etc.) employed by the firm in production of output, and the technical efficiency of the means of production. This framework has the advantage of providing channels through which circumstances affecting costs may be conceived to flow. Logically, changes in costs may be broken down along these lines, so that the economist can set up useful categories for the study of both the sources and the consequences of cost variations.[3]

SHORT TERM VARIATIONS IN COST

Many business decisions involving cost relate to the short term. In dealing with these issues, businessmen can properly assume that most of the conditions affecting unit costs are fixed. Within the bounds of a single selling or producing period it is unlikely that much shift in material prices or labor rates will be experienced. Certainly, in the short term it is appropriate to regard the technique of production as fixed. And changes in size of plant can be accomplished only slowly. Therefore, the businessman is concerned primarily with the effect of one variable—rate of production—on unit costs. In a practical sense this interest in a single variable is well taken: it is by far the most usual source of change in costs.

Fixed and Variable Costs

In the short term the costs of a business company can be divided into two classifications, those which remain the same in total amount in the face of changes in the volume of output and those which do not. In the former classification fall such items as the depreciation on buildings which the firm occupies, taxes and insurance on these buildings, and the minimum amount of maintenance expense which is necessary to keep them from deteriorating. Machinery normally outlasts a single accounting period, and its life may not be greatly affected by short-term fluctuations in production. Under these conditions depreciation on machinery also would be classified as a fixed cost. And this would be true in the economic sense, even though accounting convenience indicated depreciation to be associated, on a production basis, with each unit of output. On the other hand, if machinery were not owned by the firm but were leased, say, from the United Shoe Machinery Corporation on a variable rental based on volume of production, this would be a variable cost. Direct labor and materials are usually variable costs.[4]

These distinctions between fixed and variable costs are not difficult to make in the large, and they have immediate practical importance for businessmen even in this somewhat imprecise form. If a railroad, for example, plans to run a skiing excursion train to the mountains on Sunday, the costs which are relevant to the decision are recognized as being less than the average of all passenger costs, including full, prorated overhead. And such cost knowledge, combined with estimates of demand, may influence the railroad to set excursion rates lower than those for regular travel.

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[3] *Ibid.*, p. 13.

[4] The terms "fixed" and "variable" are relative ones. The longer the time period involved, the more factors are variable and the fewer are fixed.

The economist, however, wishes to reduce these relationships to precise statement. He seeks exact understanding of how changes in the rate of utilization of fixed plant influence unit cost. This leads him to formulate the short-term cost function which is constructed on the assumption—usual in economic analysis—that all other things remain the same. Thus he assumes that, as volume of output is varied, the plant remains the same, the same technology is still employed, the prices of input factors remain unchanged, methods of distribution are unaltered, etc. This allows him to isolate the functional relationships between cost and volume of output. Changes in cost, in the economist's model, are directly attributable to changes in output.

Exhibit 1

DAILY COST SCHEDULE FOR SMALL FACTORY

(1) Output No. of Units	(2) Total Fixed Costs	(3) Average Fixed Costs	(4) Total Variable Costs	(5) Average Variable Costs	(6) Total of All Costs	(7) Average Total Unit Cost	(8) Marginal Cost
1	$32.00	$32.00	$ 7.20	$ 7.20	$ 39.20	$39.20	
2	32.00	16.00	12.90	6.45	44.90	22.45	$ 5.70
3	32.00	10.67	17.40	5.80	49.40	16.47	4.50
4	32.00	8.00	21.00	5.25	53.00	13.25	3.60
5	32.00	6.40	24.00	4.80	56.00	11.20	3.00
6	32.00	5.33	26.70	4.45	58.70	9.78	2.70
7	32.00	4.57	29.40	4.20	61.40	8.77	2.70
8	32.00	4.00	32.40	4.05	64.40	8.05	3.00
9	32.00	3.55	36.00	4.00	68.00	7.55	3.60
10	32.00	3.20	40.50	4.05	72.50	7.25	4.50
11	32.00	2.91	46.20	4.20	78.20	7.11	5.70
12	32.00	2.67	53.40	4.45	85.40	7.12	7.20
13	32.00	2.46	62.40	4.80	94.40	7.26	9.00
14	32.00	2.28	73.50	5.25	105.50	7.53	11.10
15	32.00	2.13	87.00	5.80	119.00	7.93	13.50
16	32.00	2.00	103.20	6.45	135.20	8.45	16.20
17	32.00	1.88	122.40	7.20	154.40	9.08	19.20
18	32.00	1.78	144.90	8.05	176.90	9.83	22.50
19	32.00	1.68	171.00	9.00	203.00	10.68	26.10
20	32.00	1.60	201.00	10.05	233.00	11.65	30.00

Source: Albert L. Meyers, *Elements of Modern Economics*, 3d ed. (New York: Prentice-Hall, Inc., 1937, 1941, 1948), p. 158. Reproduced by permission.

The Family of Cost Curves

Fixed and variable costs can be presented by three methods of statement for each volume of output: as totals, as averages, and as marginal quantities. A hypothetical example showing total and average fixed costs, total and average variable costs, totals and averages of all costs, and marginal costs is presented in Exhibit 1 for a small factory with a range of daily output from one to twenty units. No explanation seems required for total and average costs. Marginal cost is the additional cost of producing a total output greater by one unit than that being currently produced. Necessarily, the marginal statement of costs is based on comparisons of the successive totals of *all* costs or, more specifically, on that part of all costs represented by total variable costs. It can be noted in Exhibit 1 that marginal costs of column 8 can be derived from either column 6 or column 4. Total fixed costs of column 1, being unchanged for all volumes of output, have no effect on marginal costs. Exhibit 2 presents the tabular data of Exhibit 1 in graphic form. As in all graphics of this sort, continuous variation, rather than discrete observations such as are shown in the table of Exhibit 1, is assumed.[a]

Shape of the Short-Term Average Cost Curve

Inspection of Exhibit 2 indicates that the average total cost per unit (*ATUC*) at first declines as output is expanded and then, after reaching a minimum point, begins to rise. The initial decrease in costs is explained partly in terms of "spreading the overhead"—note the decline of average fixed costs (*AFC*)—and partly by greater efficiency in use of variable factors. The latter is shown by a decrease in average variable cost (*AVC*) and represents a more favorable relationship between fixed and variable factors. (E.g., a few men operating a large plant constitute an inefficient labor force; increase the number of workers, and each man produces more units of product.) As production expands, however, the rate of decline of average fixed cost (*AFC*) is less than in the early stages. Also, mounting inefficiencies in the use of variable factors cause the average variable-cost curve (*AVC*) to turn up. (E.g., additional workers, as output expands, may get in one another's way, preventing a propor-

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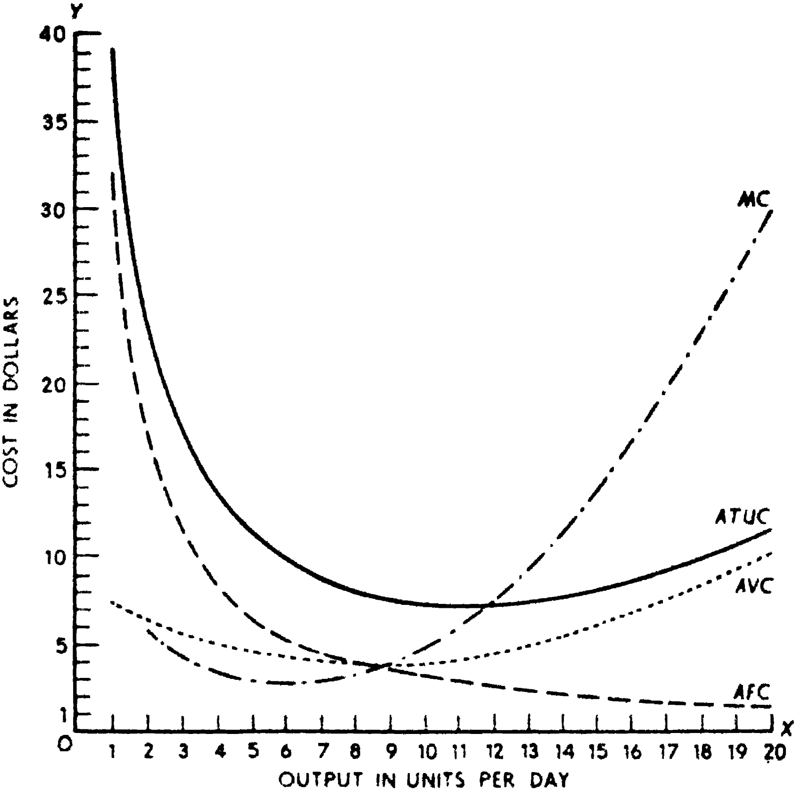
[a] Let the reader assume that output of column 1 in Exhibit 1 is stated in millions of units. Then minute variations of one unit of output on the horizontal scale of Exhibit 2 cause practically continuous variation in costs, which for this purpose can be carried to ten decimals.

Exhibit 2

DAILY AVERAGE FIXED COST, AVERAGE VARIABLE COST, AVERAGE TOTAL UNIT COST, AND MARGINAL COST FOR SMALL FACTORY



Source: Exhibit 1, p. 151. Reproduced by permission.

tional expansion of product.[9] Eventually the upward tendency of *AVC* overcomes the downward bearing of *AFC*, and average total cost per unit (*ATUC*) increases. The U-shape of the average total unit cost curve is caused basically by variation in the proportions in which fixed and variable factors are used.[10] Necessarily, the shapes of short-term total and marginal curves also reflect these stages of increasing and decreasing efficiency.

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[10] This is an expression of the fundamental physical law of diminishing returns, which can be stated as follows: If to a fixed quantity of a productive factor successive increments of a variable factor are added, the resulting increments of output will at first increase in amount and, after attaining a maximum, will gradually decrease.

In textbook exposition it is convenient to make the average-cost curve distinctly bowed or U-shaped. Actually, there is great diversity in the shapes of firms' average-cost curves. Some are almost flat and horizontal for most of their length. With curves of this sort, outputs of differing size are produced at very little difference in unit cost. Other cost curves are V-shaped, with only a small range of practical production near minimum cost. The precise shape of the firm's cost curve depends on (1) the relative importance of fixed and variable costs and (2) the conditions of production which govern the variable-cost curve. With regard to the former, where fixed cost is a large share of total cost, the decline of average fixed costs may cause a decline in average total costs over a wide range of possible production. The shape of the average variable-cost curve is determined by several conditions of production, including the relative flexibility of technical processes in the plant. Some machines, for example, are designed for one—and only one—worker. Similarly, the divisibility of production factors also affects the cost curve. If more machines of similar design can be employed as output expands, the additional product may be got at no advance in cost. On the other hand, a continuous-process paper mill must be run as a whole or not at all. Another condition affecting the shape of the variable-cost curve is the capacity to use the plant only as much as needed to produce a given output. Some plants can curtail and start up operations more easily than others. Some plants, also, can vary production, as do coal mines, by working more or less days per month. Industrial companies frequently control the amount of production by varying the number of shifts.

The Short-Term Cost Function in Accounting Usage

The businessman relies on accounting records for cost information, but, as has been suggested, the purposes for which these records are kept are not usually those of showing the effect of variations in volume of output on unit costs. In computing standard costs, for example, the effort is to define a normal unit cost unaffected by variations in volume of production. Even here, however, there is an awareness that unit costs vary with volume, for the cost accountant tries to select standard unit costs which occupy the middle of the range of variation. In the case of some other accounting devices, such as break-even charts, recognition of fixed and variable costs is more explicit. Assuming no change in unit revenue, the break-even chart shows the effect on profits of spreading the overhead. Flexible budgets are similar to break-even charts, except that they deal only with costs; they estimate the level to which total costs will rise at various projected volumes of activity. Incremental costing and the calculation of marginal balances associate specific costs with additional units of output. In these accounting techniques there is the attempt to deal, more or less directly, with the short-term cost function.

It must be recognized that, in accounting usage, fixed and variable cost cannot be so rigidly defined as in economic theory. Necessarily, some of the so-called "fixed" costs are, in actual practice, somewhat variable. Management may treat certain costs, such as research and executive salaries, as fixed, despite variations in output of, say, 10 per cent. But let sales volume change 50 per cent, and these costs also would be adjusted. Similarly, some "variable" costs are such only because of management's decision. It may be the policy to vary certain direct labor costs with volume of output. But, if orders decline, management may decide to retain workers in the slack period rather than permit the organization to disintegrate. So-called "variable" costs are, therefore, fixed at some points in the range. An awareness of these differences in accounting and economic usage will avoid confusion in the study of short-term cost variations.

LONG-RUN VARIATIONS IN COST

Some business decisions call for the calculation of costs which are likely to be experienced in the long run. In making investments in machinery, for example, the businessman considers the costs which he will encounter over the operating life of this equipment, which may extend for five or ten years into the future. Investments in basic plant push the time horizon of the businessman even further away.

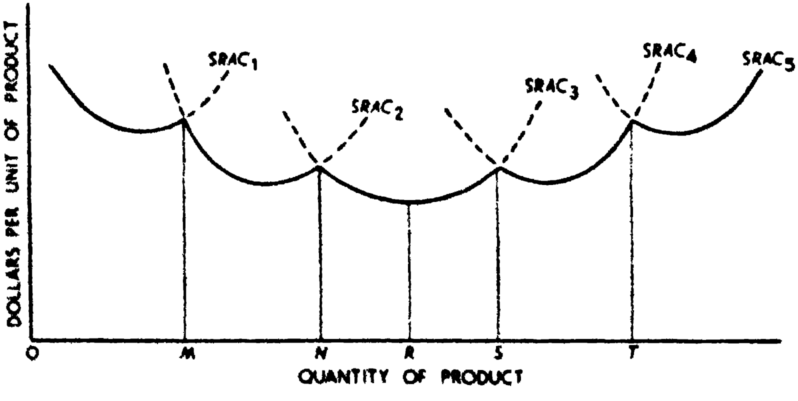
What are the differences between the short- and long-run cost functions? Both involve the relationship between cost and output. And in both instances the economist assumes that other conditions—such as the nature of the product, the prices of input factors, and technologic methods—remain unchanged. The chief distinction is that in short-term cost calculations the period is so brief that plant and equipment cannot be modified (i.e., added to or worn out); they are fixed costs. Variations in cost, therefore, are principally attributable to variations in the rate of use of fixed plant and equipment. As the period for business calculations is extended, more and more modifications are possible in fixed plant. If it appears, for example, that an advance in sales is likely to be sustained, management invests in newer and larger machinery, which may lower cost. Ultimately, when the time range of calculations is still further extended, it becomes possible to adjust *all* factors of plant and equipment to the most advantageous size. In effect, all costs are variable. The long run, therefore, is to be defined functionally rather than in terms of any certain number of years: it is a period which is sufficiently long to permit the adjustment of all factors in the most favorable combination for the production of any given output.

The Long-Run Cost Curve

In the short term an increase in demand for the product is met by more intensive utilization of fixed plant. This is accomplished by the application of more variable factors, such as the employment of more workers and the use of more materials. Graphically, output expands by movement along the short-run cost curve, $SRAC_1$, in Exhibit 3. When output has expanded to OM, it becomes evident that more investment in fixed plant will reduce costs. Accordingly, the larger plant is built and the new curve, with greater fixed costs (but lower unit costs) is $SRAC_2$. If demand continues to increase, management expands output further, until, at ON, more investment in

Exhibit 3

SHORT-RUN AVERAGE COST CURVES FOR PLANTS OF DIFFERENT SIZE

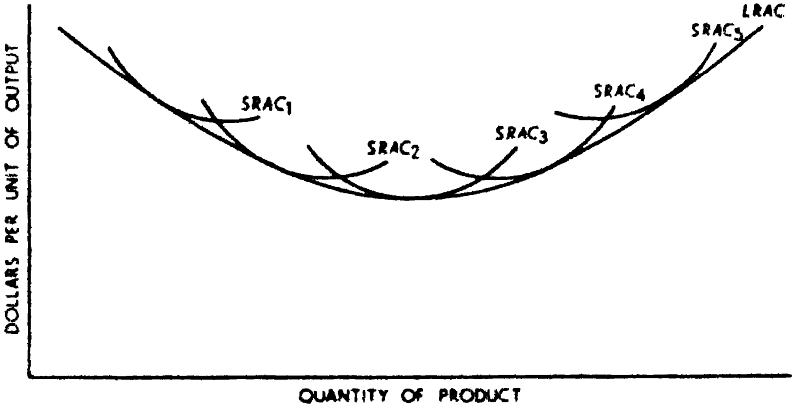


plant seems advisable. With the new short-run cost curve, $SRAC_3$, unit costs reach a long-time minimum at *OR*. If continued increases in demand lead to still more investment in plant, the expanded output may be available only at higher unit costs of $SRAC_4$. But even with increasing costs it may be worth while to expand output. However, at *OT* it becomes evident that further output is more cheaply gotten through still larger investment with plant curve $SRAC_5$. The solid lines of the successive short-run cost curves of Exhibit 3 indicate the path of movement of costs as management expands (or contracts) output in a given plant and as it shifts from one plant to that of next larger (or smaller) size. The dotted lines indicate what short-run costs would be in each size of plant if no shift were made to a plant of more favorable size. The wavy solid line is sometimes called a "planning curve" because it represents costs for outputs of different size when adjustments have been made in investment and rate of plant use appropriate to the size of output.

If it were technically possible, adjustments in plant would be made so that each size of output would be produced in a plant of the size most advantageous for that output. In formal economic theory an infinite range of plant size is available, making possible continuous adjustment of plant to output. Instead of the wavy solid line of Exhibit 1, we have the smooth curve *LRAC*, of Exhibit 4. The long-run average-cost curve represents the continuous adjustment of short-term plant curves, such as $SRAC_1$ and $SRAC_2$ (and an in-

Exhibit 4

SHORT-RUN AND LONG-RUN AVERAGE-COST CURVES



finite number of other short-term curves), to variations in output. Curve *LRAC* is *tangent* to each short-run curve, and it touches only one of these, $SRAC_3$ at the point of lowest *short-term* costs. It is tangent because, with infinitesimally small adjustments in plant size possible (and this is what economic theory assumes), it is always advantageous, in the stage of *decreasing* long-run costs, to underutilize a larger plant than to operate a smaller plant at *its* minimum cost. In the stage of *increasing* long-run costs it is more advantageous to overutilize a smaller plant than to operate a larger one at *its* minimum cost. Only at its lowest point does the long-run cost curve touch the minimum point of a short-run curve.

Economies and Diseconomies of Scale

The U-shape of the short-term cost curve was explained in terms of more and less favorable rates of utilization of fixed plant. In long-run adjustments there is also some change in the rate of use of fixed plant as output varies. But this change is co-ordinated with a more important change in plant size. It is a matter of common observation that plants of the smallest size have higher costs than those of somewhat larger size. Reductions in unit cost are experienced through expansion in the size of plant. After a certain point, however, these economies are exhausted and higher costs set in. Thus the long-run cost curve, like that for the short run, has a U-shape, but for somewhat different reasons.

The usual explanation advanced for this phenomenon is that, in the early stages of expansion, plants of larger size enjoy advantages in specialization of labor, in the use of improved techniques of production, in finance, and in mass distribution of the product. Eventually, expansion of output brings no further reduction in costs from these sources. Instead, diseconomies of scale begin to appear. Larger size creates problems in co-ordination of operations; formal rules are substituted for individual judgment; bureaucratic red tape leads to increases in cost. The stages of decreasing and increasing long-run cost for the firm vary greatly from industry to industry. In some industries the economies of size are such as to lead to one or a few firms dominating the field. Such results pose questions of individual company policy and of public policy. These will be treated in later parts of this volume.

Basically, the U-shape of the firm's long-run cost curve is attributable, as in the case of the short-term curve, to variations in the proportions in which production factors are employed. The conditions under which these variations occur differ, however, in the two cases. In the short term it was the fixity of plant and equipment which was primarily responsible for the U-shaped curve. In the long run the indivisibility of factors in certain specific forms leads to variation in unit costs with variation in output. For example, a power shovel is more efficient than an equivalent number of hand shovels, but the small contractor cannot use one-tenth or one-twentieth of a power shovel.[11] In the stage of increasing costs the problem is essentially one of indivisibility of the factor management.

Size of Plant versus Size of Firm

The reasoning of economic theory about the long-run cost curve runs largely in terms of plant size. A plant has been defined as "an integration of various fixed factors of *production*, typically machines, building, production layout, organization, etc."[12] This is a techological concept. A firm, on the other hand, includes more than a single economic operation, such as is connoted by the term "plant." A manufacturing firm, for example, may also conduct marketing operations, though this is not essential. There is no necessary reason why the optimal size (i.e., that at which unit costs are a minimum) of the marketing unit should coincide with the optimal size of the producing unit. A businessman must balance the two so as to achieve the lowest net costs of producing *and* marketing. Management must likewise consider other aspects of operation, such as financing, in seeking the most advantageous size of firm. One authority has suggested that there are five major classifications of cost influences to consider: technical, managerial, financial, marketing, and those bearing on the ability to withstand risk and fluctuations in revenue.[14]

The concept of size, moreover, has several dimensions. We can speak of size as capacity at the same level of operations. This is called "scale" and is measured "horizontally." Another dimension of size is measured "vertically" and represents the number of stages through which production is carried. This can be called "depth." Adequate treatment of the effect of size on cost must distinguish not only between plant and firm but between scale and depth. It is probable, for example, that in some industries production costs will be primarily affected by the *scale of plants*. In others the degree of vertical *integration among firms* may be the most important factor.

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[11] Rental to some extent modifies the indivisibility of factors.

[12] Conference on Price Research, *op. cit.*, p. 220. Italics added.

[13] Some companies, such as textile mills, delegate the performance of marketing functions to other firms called "selling agents." The mill is then a production specialist. Similarly, financing functions are delegated by some textile firms to specialized bankers called "factors."

[14] E. A. G. Robinson, *The Structure of Competitive Industry* (New York, Harcourt, Brace & Co., 1932), p. 16.

Size, as it relates to the range of goods produced and marketed, is also significant. In this connection the distinction between plant and firm is critical. Many firms find it advantageous to include in their marketing operations goods which they do not themselves produce.

Size can also be measured in terms of the geographic spread of plants. Migration of industry, under the influence of varying prices of input factors (e.g., low-cost labor in the South) or market orientation, plays a part in determining costs of competing firms. Changes in transportation rates may have a major effect on production and marketing costs. Multiplant firms, particularly where there is geographic distribution of plants, meet these changes more or less successfully than do single producing units.

Variations in the size of firm which involve changes in several of the above factors are too complex to indicate with any clarity what forces are really responsible for changes in cost. It is probably for this reason that economic theory has limited the concept of the long-run cost curve to changes in scale of plant.

Flexibility in Plant Size

Finding the relationship between size of plant and costs is complicated by the fact that many plants are characterized by "built-in flexibility"; that is, they are constructed so as to be reasonably efficient over a wide range in volume of output. Flexibility is necessitated by the experience of many companies with unavoidable fluctuations in output. Thus a retail food store almost certainly finds business on Friday and Saturday greater than on other days of the week. And, despite efforts to attract off-season trade, many retail establishments find that December brings peak volume, while February and July are dull months. Manufacturing companies also find it necessary to handle wide fluctuations in output. One of the usual methods of obtaining the desired flexibility of plant is to use many small machines instead of a smaller number of large machines. Under these circumstances costs are little affected by shifts in volume. It should be pointed out, however, that this is a deliberate avoidance of the most efficient combination of factors.[13] Other aspects of flexibility lead businessmen to build plants which can be rapidly expanded to accommodate long-run shifts in demand. Thus a plant may be capable of being reduced in scale with the onset of a depression; this gives it an obvious competitive advantage. Still another aspect of flexibility concerns the easy shift to different products from the one for which the plant was originally designed. An example of inflexibility of plant in this connection is that of the Ford Motor Company at the time when it was producing the Model T. Several months of production time were lost in retooling for new models.[16]

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[13] J. M. Clark comments, "A plant will often make its boilers, dynamos, vats, or what not, smaller than the most economical size, for the sake of the flexibility that goes with numbers" (*Studies in the Economics of Overhead Costs* [Chicago: University of Chicago Press, 1923], p. 117).

Measurement of the Relationship between Cost and Size of Plant

The major difficulty in arriving at an understanding of the relationship between cost and size is the presence, in practically all business situations, of many variables other than those affecting this single relationship. Even after it has been determined to concentrate on the problem of the scale of plant, as distinguished from the other considerations discussed above, there remain many irrelevant forces at work. Recorded plant costs are affected by variations, not only in scale, but in the following: (1) rate of use of fixed plant, (2) prices paid for input factors; (3) state of the arts; (4) managerial skill, (5) accounting valuations and procedures; (6) locational advantages; and (7) character of products.[17] It has been noted previously that changes in scale also involve co-ordinate changes in rate of use of plant. The other factors listed, although actually variable in most business situations are assumed constant in the long-run cost curve of economic theory.

Several techniques for comparison of plant size have been used. Tracing the effects on cost of the growth of a single plant over time, comparisons of actual costs of plants of different size operated by the same company, comparison of actual costs of plants (operated by different companies) during the same period, and engineering estimates for plants of different size—these have all been employed in determining the relationship of costs to size.[18]

EFFECTS OF CHANGES IN TECHNOLOGY ON COST

In an earlier section we considered the effect on cost of changes in the rate of utilization of fixed plant and equipment. There were also presented the long-run effects on cost as size of plant was adjusted to variations in output. In both instances it was assumed that other factors, such as technical methods and prices of input factors, remained constant. No source of change in unit costs, however, is more significant than innovation in production methods. Technologic change has been so frequently associated with reduction in costs that it has become a symbol of progress.

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[16] Conference on Price Research, *op. cit.*, p. 225.

[17] *Ibid.*, p. 236.

[18] *Ibid.*, p. 239.

Meaning of Technologic Change

As in the other relationships which he employs to explain changes in unit cost, the economist, in speaking of technologic change, has a very precise concept in mind. The Conference on Price Research of the National Bureau of Economic Research has defined technical change as "any change in input-output relations which is not to be attributed to changes in factor prices or variations in the rate or scale of production of the enterprise in question."[29] Technologic change or innovation, in this usage, is the residual cause of change in unit cost. Specifically, " 'any change in input-output' relations is intended to cover variations in *amount* of output, in the *combination* of factors employed, or in the *quality* of input factors or product under conditions of given 'plant.' An innovation may arise from a change in the effectiveness of a single factor or from the way in which various factors are combined."[30]

The concept outlined above must be differentiated from mere mechanization of production, which is only one form of technologic change. In the economic sense a shift in production methods which rearranges tasks and operations but which does not introduce new machinery would also be called a technologic change. The concept should also be distinguished from invention which indicates only the *possibility* of change. An invention must be applied in production to become a technologic change. Similarly, it is evident that innovations do not necessarily involve patents; many innovations are operating improvements essentially nonpatentable in nature.

Technologic changes have often been designated as "labor-saving" devices. Similarly, others are identified as "capital-saving" innovations, but this distinction is not significant for the present discussion. Many technical improvements involve no substitution of capital for labor, or vice versa, but consist in the replacement of one grade of capital with another, etc. Also, an innovation introduced at one point in the economy may displace labor or capital immediately, but the ultimate results, as to its labor-saving or capital-saving effects, are not known until the impact on the total economy is observed. Thus there is no reason in what follows to confine our attention to technical changes which appear to be clearly labor-saving (or, contrariwise, to those that are capital-saving).

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[29] *Ibid.*, p. 143.

[30] *Ibid.*, pp. 143–44. Italics added.

Types of Technologic Change

Changes in technology have been defined above in terms of economic effect on costs. It is also possible to classify technical changes according to their physical nature. Even this approach, however, is difficult because of the interdependence of the various types of innovations. As an example, certain chemical processes which have greatly reduced labor costs could not have been introduced without the prior development of new materials, such as alloy steels. Despite this overlap, it is convenient to describe technical changes under the following headings: (1) power and energy development; (2) materials; (3) processes (including multiple-function machinery); (4) individual single-function machinery; and (5) management methods.[21]

As new sources of power have become economically available, there have been marked shifts from coal to fuel oil, natural gas, and hydroelectric power. In 1920, for example, the average number of pounds of coal used by freight locomotives per thousand gross ton-miles was 172. By 1938 this had fallen to 115, or by 33.1 per cent. The use of newer sources of energy has also led to the introduction of more efficient, modern types of equipment, many of which are electrically operated. Industrial use of atomic energy could bring major shifts in cost functions.

Improvement in materials has had two results: use of substitute materials and improvement in the quality of products. Prior to World War I, automobiles were painted with natural enamels. Many coats were required, and the whole process took more than two weeks. With the introduction of nitrocellulose lacquers, the drying period was so much shortened that the painting operation was reduced to a matter of hours. Several years later the introduction of synthetic enamels further reduced costs by the use of only three or four coats instead of the ten coats formerly required. As an example of improvement in product, the average life of railroad ties has been extended from eight to twenty-one years by treatment prior to use.

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[21] Material in this and the immediately following paragraphs is adapted from Lewis L. Lorwin, *Technology in Our Economy* (*T.N.E.C. Monograph No. 22*) (Washington, D.C., Government Printing Office, 1941), pp. 98 ff.

Technical change sometimes takes the form of new processes involving mechanical improvements without chemical reaction or use of electrical energy. A spectacular example of this type of improvement is in the continuous-process industries, where multiple-function machinery, as in steel strip mills, replaces hand processes. Technical change also comes through the replacement of mechanical processes by nonmechanical methods, as in the case of electric welding being substituted for riveting.

Improvements in individual single-function machinery appear in three ways: through substitution of mechanical for hand operations, through increased speed of operation, and by increasing capacity. In railroad transportation many mechanical devices have been substituted for hand operations: automatic block signals, automatic train control systems, and interlocking plant and remote control have made it possible to manipulate all main-line track switches and signals in a given district or entire division by a centralized traffic control board. In the manufacture of cigarettes increased speed of operations, with consequent cost reduction, has been achieved by substituting rotating cutting knives, which are automatically sharpened and cleaned as the machine operates, for the old type of reciprocating knife, which operated in an up-and-down stroke and which had to be stopped for frequent sharpening. Enlargement of capacity has also led to cost savings. The average dipper capacity of power shovels sold to mining companies increased from 1.73 cubic yards in 1920–23 to 3.28 cubic yards in 1932–36.

Finally, among the types of technologic improvements, management methods have made an important contribution to cost reduction. Selection and training of workers for specific jobs, improved working methods, reduction in hours, and incentive pay systems have all played a part. In the production of clothing prior to 1932, the bundle system, whereby each worker performed certain operations on all garments in the bundle before turning them over to others for subsequent operations, was replaced by the straight-line system of production. The latter system permitted the materials to pass from worker to worker as successive operations were performed. This eliminated the carrying of bundles from one end of the shop to the other and the lifting of tons of garments by the operators throughout the course of the day. "One engineering firm licensed to install the system claims that a certain garment company increased production 50 per cent, cut manufacturing costs 25 per cent, reduced clerical work 33⅓ per cent, and inspection costs 60 per cent, saved 25 per cent of the floor space, and vastly reduced inventory of goods in process."[22]

Measurement of Technologic Change

A usual method of measuring increases in productivity, as a result of technologic change, has been through indexes of output per man-hour. Labor input is measured as number of hours worked. Output per man-hour is then measured by dividing an index of production by an index of hours worked. Production and productivity, measured in this manner, are shown in Exhibits 5 and 6 for all manufacturing and for steam railroads, bituminous coal mining, and anthracite coal mining for the period 1909–39

Exhibit 5

PRODUCTION AND LABOR PRODUCTIVITY IN MANUFACTURING, STEAM RAILROADS, BITUMINOUS COAL MINING, AND ANTHRACITE COAL MINING, 1909–39

Year	Manufacturing		Steam Railroads		Bituminous Coal Mining		Anthracite Mining	
	Production	Output per Man-Hour	Traffic	Output per Man-Hour	Production	Output per Man-Hour	Production	Output per Man-Hour
1909	56.5	66.2			67.2	70.1	86.0	81.9
1914	60.5	76.4	69.8	78.2	74.9	77.8	97.3	86.8
1919	79.3	76.1	91.8	88.6	82.5	85.8	94.1	96.6
1923	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1924	94.3	105.8	94.3	103.0	85.6	101.7	94.2	94.4
1925	106.5	113.2	99.2	108.5	92.1	101.0	96.2	94.9
1926	112.5	116.9	104.8	111.1	101.6	100.3	90.5	95.4
1927	113.3	120.8	101.0	110.8	91.7	101.6	85.9	98.3
1928	121.2	129.5	100.8	116.3	88.7	105.3	80.7	98.1
1929	130.1	131.9	103.3	118.2	94.7	108.1	79.1	96.4
1930	107.6	131.6	88.7	118.0	82.8	112.8	74.3	94.0
1931	93.7	141.3	71.6	118.8	67.7	118.0	63.9	100.2
1932	71.1	137.7	54.4	116.1	54.8	115.9	53.4	115.0
1933	81.7	144.8	57.0	129.3	59.1	110.0	53.0	126.4
1934	89.1	147.9	61.7	130.1	63.6	111.9	61.3	118.5
1935	107.7	158.8	64.6	135.9	65.9	115.4	55.9	121.3
1936	127.6	161.8	77.8	145.7	77.8	121.5	58.5	135.1
1937	134.4	157.5	83.1	148.5	78.9	124.8	55.6	142.8
1938	103.6	159.8	67.7	146.8	60.6	130.4	49.4	166.1
1939	129.5	174.5	76.7	154.9	69.1	142.1	54.4	172.6

Source: Lewis L. Lorwin, *Technology in Our Economy* (*T.N.E.C. Monograph No. 22*) (Washington, D.C.: Government Printing Office, 1941), p. 90.

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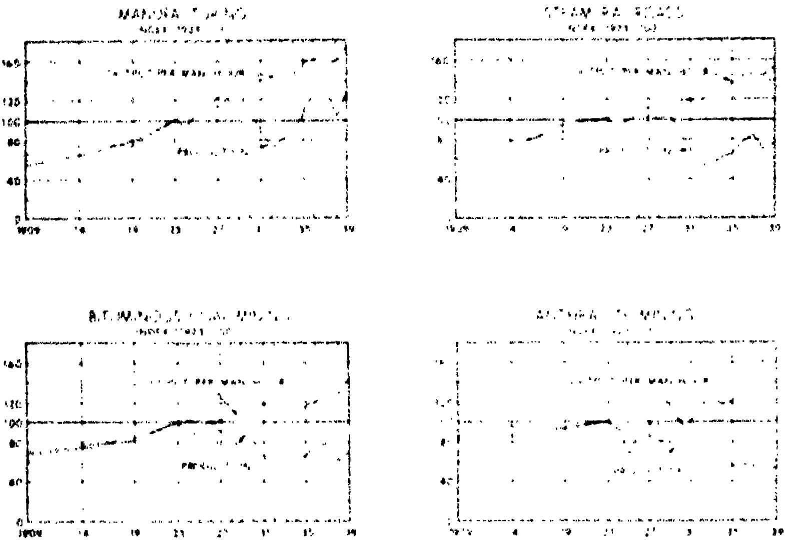
[22] *Ibid.*, p. 120.

Exhibit 6

PRODUCTION AND LABOR PRODUCTIVITY IN MANUFACTURING, STEAM RAILROADS, BITUMINOUS COAL MINING, AND ANTHRACITE COAL MINING, 1909-39



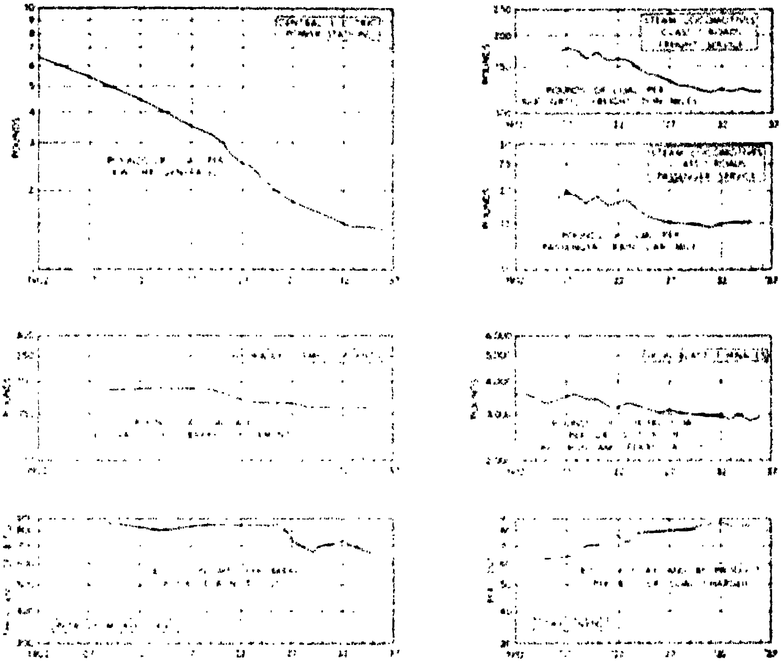
Source Exhibit 5, p. 165

A similar approach to the measurement of technical change is through the relationship of power input to units of output, for example, pounds of coal to kilowatt hours generated. Some of these measures are shown in the graphs of Exhibit 7.

The economist finds several defects in these measures of technical changes. The chief criticism is that they fail to isolate the effect of technical change proper from other influences on cost, such as changes in rates of utilization, scale of plant, and prices of input factors. There appears to be no valid reason for attempting to measure the full effect of technologic change in terms of a single factor. Necessarily, technical change involves a combination of input factors. The real problem is that of finding a common denominator for summarizing the effect of technical changes on all factors. This also is in line with the needs of business management, which is concerned with the net cost savings from technical improvements affecting the entire combination of factors of production. Greater productivity imputed to one factor is of only incidental interest. Economists have

Exhibit 7

TECHNICAL CHANGE REPRESENTED BY SHIFTS IN FUEL INPUTS PER UNIT OF OUTPUT BY LARGE INDUSTRIAL CONSUMERS



Source: Lewis L. Lorwin, *Technology in Our Economy* (T.N.E.C. *Monograph No. 22*) (Washington, D.C.: Government Printing Office, 1941), p. 90.

not yet developed satisfactory techniques of measuring the over-all effects of technical change on unit costs.[23]

Business Decisions Involving Technical Changes[24]

Despite the absence of satisfactory techniques for measuring the effects of technologic changes on unit costs, there are certain recurrent types of decisions for which businessmen have had to develop guides to action. The simplest situation is that in which an innovation, such as an improvement in working methods or in materials, contributes to the output of the present period. This kind of change is reversible, in that the innovation can be abandoned and the company can go back to its old way of operating. No capital expenditure is involved. Another type of technical change affects only the *prospective* revenues of the company. This is exemplified by an improvement in quality of the product or by the introduction of a new product. Still another type of innovation reduces future costs, leaving prospective revenues unchanged. This involves capital expenditure in the purchase of new equipment and perhaps the replacement of old. Often both prospective revenues and prospective costs are affected by the introduction of technologic changes. The essence of all these decisions involving technologic change is a comparison of present and prospective costs and revenues, in the current manner of producing, with prospective costs and revenues in the new manner.

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[23] Cf. Conference on Price Research, *op. cit.*, pp. 149–57. Professor Joel Dean suggests two methods for estimating the rate of technical advance: (1) surveying specific technical advances that are now on the horizon and tracing their cost-reducing consequences for a particular company; (2) projecting the past trend of technical advance in a given industry (*op. cit.*, pp. 282–83). He does not amplify these suggestions by the development of specific techniques.

[24] This and the subsequent paragraph are based on Conference on Price Research, *op. cit.*, pp. 157–65.

Calculations involved in the decision to replace a piece of equipment offer an opportunity to compare the set of considerations which logically "should" affect the decision with those which, in practice, usually do lead to final judgment. The comparison of prospective costs and savings "should" lead the executive to consider expected operating savings in each future year, the total present worth of these savings, the cost of the machine, the net salvage value at the end of the machine's normal life, the net salvage value of the old machine at the end of its expected life (or earlier, if the machine is sold at the purchase date of the new machine), and the residual value of the new machine at the end of the life of the old machine. If, in the light of these factors, the present worth of net gains (savings) exceeds the present worth of net costs, it is desirable to purchase the machine. "These magnitudes can at best only be estimated, and with varying degrees of confidence."[23] As a result, the probable savings from the new machine are usually deflated, in business calculations, to a figure which represents the degree of confidence that the businessman has in the estimates. This is accomplished by introducing into the estimates "safety factors," such as reductions in possible salvage value of the new machine, calculation of an interest rate which exceeds that at which the firm can actually borrow money, the straight-line method of depreciation, which overestimates probable depreciation costs on a new machine (by failing to compound earnings on successive yearly charges), and reduction of the estimated service life of the machine. This last factor is by far the most common method and has resulted in widespread demand, on the part of purchasers of equipment, that the equipment "pay for itself" in two years or a similar short period. Such low estimates of the service life of equipment are based largely upon the expected rate of technical obsolescence which may be experienced as still further improvements are developed.

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[23] *Ibid.*, p. 161.

EFFECTS OF CHANGES IN PRICES OF INPUT FACTORS ON COST

The previous sections have been based on the assumption that the prices of input factors remained constant. This permitted the isolation of the single relationship under study, such as that of costs and rate of use of fixed plant. Actually, of course, the prices of input factors change from time to time. Wage rates, material prices, and equipment prices all vary, though in short periods they may remain fairly stable. When they do change, the cost of the product is affected.

Substitution of Factors with Changes in Prices

If the prices of all input factors were to double, the unit cost of the product would necessarily double. But different factor prices ordinarily do not change at the same time and by the same amount. When input price changes are unequal, firms find it advantageous to use new combinations of factors, substituting those of lower cost for those of higher cost. For example, if the wage rates of workers loading bituminous coal advance, mining companies may substitute mechanical loading equipment for workers who load by hand. As a result, the cost of producing a ton of coal advances by less than the amount of the wage increase.

Influence of Firm on Factor Prices

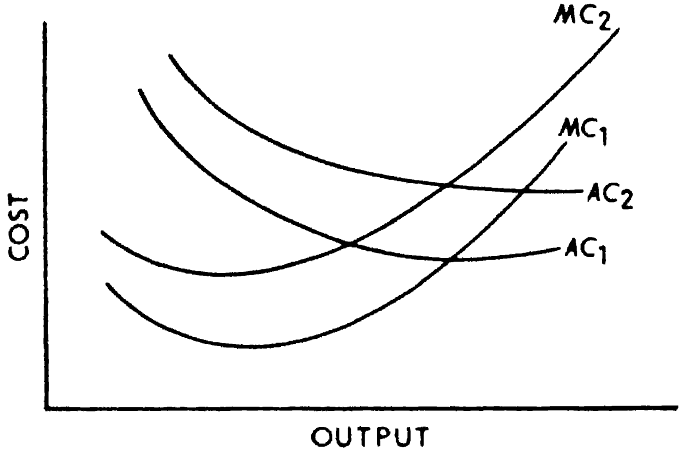
Under some circumstances an increase in the output of a single firm may be correlated with a change in the prices of input factors. This can occur when the firm buys such a large share of the total supply of the input factor that its purchases influence the market price. In this case we must distinguish the effects on cost of expansion of output *per se* from the effects of greater purchases on market price of the factor.

Effect of Factor Price Changes on Cost Curve

In the earlier sections, changes in output were represented graphically by movements along the short- and long-run cost curves, respectively. A change in the underlying conditions of production,

Exhibit 8

SHIFTS IN AVERAGE- AND MARGINAL-COST CURVES



such as in the prices of input factors or in the nature of the product, brings a shift in the entire cost curve, as shown in Exhibit 8. This is analogous to changes in the underlying conditions of demand which cause shifts in demand curves.

BUSINESS USE OF ECONOMIC COST ANALYSIS

Problems in Applying Analysis

It is at once evident that the cost relationships sought by the economist are not available from conventional accounting records which are maintained for different purposes. It is also possible that the needs of the businessman go beyond the present capacity of either accountants or economists to supply information.

How far can businessmen go in the precise, as distinguished from rule-of-thumb, application of the economist's cost functions? It must be recognized at the outset that the economist has merely provided "a *formal* solution to the decisions that confront the business executive by selecting a limited number of relationships upon which the final judgment is to be based. . . ."[26] Even within this limited orbit of relationships in the economist's model, the businessman is called upon to make decisions which are of the utmost complexity. He is supposed, for example, to combine factors of production in such manner that their marginal productivities are equal and so that these marginal contributions equal in value the price of the factor. This is the basic principle of production economics. In order to make these refined decisions the businessman must know the several relationships previously described in the economist's model: the way in which cost responds to changes in output produced with a given plant, the costs of building different sized plants and the operating costs which will be experienced in these plants, the relationship of unit costs to alternative techniques of production, and the effect of changes in prices of input factors on unit costs.

Lack of Information

Seldom, if ever, can business executives be expected to possess an accurate and complete knowledge of the relationships indicated. "The accounting records cannot be very revealing, as they are the results of many divergent factors during a single period. It is an exceedingly difficult task to isolate the effects of a single relationship in the total picture and one seldom undertaken by accountants. For instance, it is possible to learn from accounting records how sales and advertising expenditures have varied. But sales may have fluctuated because of factors other than advertising expenditures: changes in the income of the community, the policy of competitors, factor price variations, etc. The simple relation between advertising outlays and sales, which economic theory presumes the business executive to know, is far from easy to isolate in quantitative terms."[27] Moreover, even given the possibility of conforming accounting records to the needs of the economist, there remains the question of expense. Record keeping costs money, and many businessmen are persuaded that informed guesses are preferable to more precise judgments made on the basis of costly records. (The balancing of record-keeping costs against operating savings—it might be pointed out—is itself a marginal calculation.) In any case, the records, to give *complete* information to the businessman, would have to extend to many relationships beyond the simplified categories of the economist's model. Under these conditions it is not surprising to find that economic cost functions are usually disregarded in business practice.

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[26] *Ibid.*, p. 18.
[27] *Ibid.*, pp. 19–20.

This is not a reason for discarding economic theory. Its task is not that of describing business conduct in precise detail. Rather, it has the responsibility for suggesting, on the basis of the pure logic of economic relationships, hypotheses which can be useful in improving business methods. Several examples of these methods employing economic concepts of cost are available: break-even point analysis, flexible budgets, and incremental costing. These methods are designed primarily to show the influence of changes in volume of production on costs. As such they are concerned with the economist's short-term cost function. A logical next step is to develop similar techniques to cover other functional relationships bearing on changes in cost.

SUGGESTED READINGS

Bain, Joe S. *Pricing, Distribution, and Employment*, pp. 90-94, chap. iii. New York: Henry Holt & Co., Inc., 1948. A good exposition of the theory of cost chiefly from the point of view of the firm.

Boulding, Kenneth E. *Economic Analysis*, chaps. xxii and xxiv. Rev. ed. New York: Harper & Bros., 1948. These chapters which cover some related matters as well, are devoted principally to cost. The author emphasizes the relation between cost and supply.

Burnham, Elizabeth A. "The Influence of Size of Business on Department Store Operating Results." *Harvard Business Review*, Vol. XVI (winter, 1938), pp. 211-25. Also "The Department Store in Its Community," *ibid.*, Vol. XVIII (summer, 1940), pp. 455-71. These studies are based on data from the annual reviews of department-store operating data published by the Harvard Graduate School of Business Administration.

Conference on Price Research. *Cost Behavior and Price Policy*, chaps. ii, iv, vi, vii, x. New York: National Bureau of Economic Research, 1943. Chapter ii contrasts the economic theory of cost with accounting practice. Chapter iv, "Costs and Rate of Output," is probably the best treatment of short-term costs from the standpoint of economic analysis of accounting data. It discusses the short-run cost function and the allocation of fixed costs. The discussion of statistical cost functions and break-even charts in chapter x is also excellent. Chapter vii, "Technical Change and Costs," presents an illuminating discussion of the problems in this area. As indicated in the footnotes, the authors have drawn heavily on this material. Chapter x, "Costs and the Size of Plants and Firms," is a definitive treatment of this subject.

Dean, Joel. "Cost Structures of Enterprises and Break-Even Charts," *American Economic Review*, Vol. XXXVIII (*Papers and Proceedings, May, 1948*), pp. 153–64. An incisive criticism of break-even chart analysis from the viewpoint of economic theory and management application.

Dean, Joel. *The Relation of Cost to Output for a Leather Belt Shop.* Technical Paper No. 2. New York: National Bureau of Economic Research, 1941. A study of short-run costs in an industrial situation which afforded unusual opportunities to isolate the effect of variations in production on costs.

Due, John F. *Intermediate Economic Analysis*, chap. iv. Rev. ed. Chicago: Richard D. Irwin, Inc., 1949. The author defines the terms of cost analysis.

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McFarland, Walter B. "When Is Selling at a Loss a Profitable Business Policy?" N.A.C.A. *Bulletin*, Vol. XXI (November 1, 1939), pp. 328–39. A comparison of accounting costs and marginal costs and the application of these concepts to business policy in taking on a new product.

Meyers, Albert L. *Elements of Modern Economics*, chaps. xi–xii. 3d ed. New York: Prentice-Hall, Inc., 1948. Elementary theory of short-term and long-term cost.

National Association of Cost Accountants. "The Analysis of Cost-Volume-Profit Relationships." N.A.C.A. *Bulletin*, Vol. XXXI (December, 1949), pp. 523–63. A discussion of break-even point analysis.

National Association of Cost Accountants. "The Variation of Costs with Volume," *ibid.*, Vol. XXX (June 15, 1949), pp. 1229–35. Research Series No. 16. The authors explain fixed and variable costs in accounting usage.

Rautenstrauch, Walter, and Villers, Raymond. *The Economics of Industrial Management.* New York: Funk & Wagnalls Co., 1949. Chapter ix, "Sales-Expense Relationships," offers a definitive explanation of the break-even chart, a form of analysis originated by Professor Rautenstrauch.

Robinson, E. A. G. *The Structure of Competitive Industry.* New York: Harcourt, Brace & Co., 1932. The author discusses the effect of various forces, such as technology, marketing, etc., on the optimal size of firm. The discussion extends the theory of cost-size relationships beyond the usual plant-size concept.

Stigler, George J. *The Theory of Price*, chaps. vii, viii, xiii. New York: Macmillan Co., 1947. Advanced theoretical presentation of cost analysis, beginning with production functions and carrying through costs under imperfect market conditions.

U.S. Federal Trade Commission. *Relative Efficiency of Large, Medium-Sized, and Small Business: T.N.E.C. Monograph No. 13* Washington, D.C.: U.S. Government Printing Office, 1941. This monograph presents a wealth of cost-size data based largely on Federal Trade Commission files. The material suffers, however, from the presence of other factors than size influencing cost.

Vatter, William J. "Accounting Measurements of Incremental Cost." *Journal of Business of the University of Chicago*, Vol. XVIII (July, 1945), pp. 145–56. The author presents a method of breaking down accounting costs into variable and fixed in such manner that variable costs approximate marginal costs.

Short-Term Variations in Cost

Case III-1: HOMELAND TAILORING COMPANY

The Homeland Tailoring Company manufactured men's woolen suits, topcoats, and overcoats. A small part of the total output was sold under its own brand name; the remainder was sold to men's furnishings stores, department stores, and wholesalers, all of whom distributed the merchandise under their respective brand names. The company did no direct retail selling. Clothing produced under its own brand name was sold in men's clothing stores catering to individuals of higher-than-average income. The small number of salaried salesmen who constituted the sales force were under the direct supervision of Mr. Abrams, president of the company, who had founded the business in 1924. From its origin as a tailor shop it had grown to a firm producing approximately 200,000 suits and coats per year.

Actual production of clothing in the company's plant was concentrated in a period of approximately nine months each year. Since the company produced no line of summer clothing, there was a period of about three months from January 1 to April 1 when idle capacity frequently reached 90 per cent. During this period vacations were granted to as many employees as practicable, and needed repairs and renovations were made in plant and equipment.

Mr. Abrams normally sold his own brand of suits and coats at an average price of $29.50 each, and suits and coats produced under the brand names of others at an average price of $28.50 each. The price of $28.50 was arrived at by adding approximately 10 per cent to total cost per suit as the profit margin, as follows:

Labor	$10.00
Material	9.50
Depreciation	1.414
Overhead	1.93
Administration and selling expense	1.153
Repairs and supplies	1.825
Total cost	$25.822
Plus 10%, for profit	2.60
Total cost and profit	$28.422

In October, 1947, Mr. Abrams received an inquiry from the manager of a large chain of department stores operating in the southwestern part of the United States, expressing interest in placing an order for 50,000 men's suits of various sizes as specified, for delivery between April 1 and April 15, 1948. It was stated that the order would be confirmed if the price did not exceed $18.75 per suit.

Although in the past the company had taken small orders for a few hundred suits during slack periods, it had never handled such a large order or sold at a price less than $24.50 per suit at such times. There was no system of standard costs in the plant, and the accounting system was somewhat crude. Mr. Abrams, because of his familiarity with all operations, relied primarily upon his own experience in estimating costs of orders.

The chief accountant recommended that the order be rejected. Mr. Abrams, unwilling to lose this business if it could be handled profitably, sought the help of business management counsel, who prepared a new statement of costs per suit as follows:

Direct labor	$7.23	
Material	9.11	
Spoilage	0.39	
Total direct costs		$16.73
Indirect labor	$2.77	
General factory burden	1.93	
Depreciation	1.764	
Repairs and supplies	0.475	
Administrative and selling expense	1.153	9.092
Total costs		$25.822

In addition to the costs shown above, it was estimated that, because of vacations, overtime would have to be paid in the amount of

20 per cent of direct labor per unit. Inability of regular sources of supply to provide the full amount of the woolen goods required for this order forced Mr. Abrams to use other suppliers. One woolen mill was found which was willing to supply the full amount, but the mill refused to grant the usual cutters' discount of 2 per cent, net 30.

The fee of the management counseling firm was $2,000.

QUESTION

1. Should the company have accepted the order for 50,000 suits?

Case III-2: WARING GOLF AND COUNTRY CLUB

The Waring Golf Club was organized in 1929 to operate a public golf links. Its facilities included an eighteen-hole golf course, a riding academy run by a concessionaire, and 150 acres of woodland, which had been developed with bridle paths. The owners of the Waring Club intrusted the actual operation of the enterprise to a hired manager.

The club was located at the eastern edge of an industrial community of 250,000 population, about 1,000 feet beyond the city limits, and was easily accessible by both auto and public transportation. The city parks department operated two municipally owned golf links which were fairly well maintained but which were constantly overcrowded. There was a golf links open to the public 4 miles north of the city, one 2 miles west, another 9 miles south, and still another whose entrance was approximately 1,500 feet distant from that of the Waring Club. At some points this latter club was separated from the Waring Club only by a county highway. The adjoining club, which had been in operation since 1924, offered, in addition to a public golf links, dining and dancing facilities, winter sports such as skating and skiing, and, in good weather, tennis. Patrons of the adjoining club were drawn primarily from professional and middle-income white-collar groups.

The owners of the Waring Club believed there was a good business opportunity in providing golf facilities for industrial workers and lower-income white-collar groups. They believed it was not to their advantage to compete directly with the adjoining club. A preliminary survey convinced them that the provision of good-quality golf facilities for this group at moderate rates not only would draw players from the municipal links and from more distant links but also would reach persons who were not now playing because of lack of facilities at moderate prices. Rates for the Waring Club and the adjoining club in the summer of 1929 were as follows:

	Waring Club	*Adjoining Club*
Weekdays (until 5 P.M.) and Saturday mornings	$0.50	$0.75
Weekdays after 5 P.M.	0.50	1.00
Saturdays after 1 P.M.	0.75	1.25
Sundays until 1 P.M.	1.00	1.50
Sundays after 1 P.M.	0.75	1.00

Fees for Waring were for the entire day, with no limit to number of holes played. Fees for the adjoining club were for eighteen holes, with additional fees for further play.

The rates for the Waring Club remained in effect until July, 1933, when they were reduced by 15 cents in each classification. This change in rates was prompted by a decrease in the number of players, as shown in Exhibit 1. The decline in income following the crisis of 1929 had not seriously affected the Waring Club until 1933. In April of that year the fees on the municipal links, which were already lower than Waring's rates, were decreased still further, in spite of the fact that the links were heavily used. The club adjoining Waring had reduced its rates approximately 10 per cent on June 1, 1933. After the reduction in rates in July, 1933, growth in the Waring Club's business continued as before. The rates were restored to their original level in April, 1937.

In May, 1937, the manager of the Waring Club noted that the club's facilities were not being fully used at all hours of the day. The bulk of the players on weekdays appeared after 5 P.M. The average

Exhibit 1

WARING GOLF AND COUNTRY CLUB,
NUMBER OF PLAYERS BY MONTHS, 1929–36

Month	1929	1930	1931	1932	1933	1934	1935	1936
April	257	211	403	527	297	487	593	521
May	781	943	1,091	981	891	1,001	1,457	1,875
June	1,254	1,652	2,057	1,619	982	1,895	2,581	2,643
July	1,209	2,147	2,612	2,004	2,493	2,569	2,957	3,102
August	1,057	1,822	2,561	1,823	2,291	2,542	2,900	2,989
September	995	1,565	2,219	1,251	2,273	2,114	2,542	2,659
October	886	1,204	1,533	729	2,051	2,027	2,083	1,921
November	218	761	644	453	519	652	1,104	925

number of players per day during July and August, 1936, was as follows:

Day	*Before 5 P.M.*	*After 5 P.M.*	*Total*
Monday	10	30	40
Tuesday	20	50	70
Wednesday	25	65	90
Thursday	15	35	50
Friday	10	50	60
Saturday	135	15	150
Sunday	245	5	250

Increased industrial activity led the manager to propose that the club offer group rates to various enterprises employing large numbers of workers. Under these group rates, employees of the participating companies would use the golf course, or at least begin their play, before 5 P.M. each day except Saturdays and Sundays, when no players on group rates would be accepted. It was the manager's belief that an influx of players on a weekday as a group playing a tournament would not greatly reduce the number of players at regular rates on Saturdays and Sundays, when most players formed their own personal groups.

One company which the manager had approached tentatively agreed to guarantee a minimum of 100 players each Tuesday, under the conditions offered, provided that the rate was not more than 15 cents per player. The owners were not certain whether it was desirable to accept this proposal. One director, after inspecting the operating costs shown in Exhibit 2, objected to a rate of 15 cents and proposed, instead, a rate of 25 cents. The manager pointed out that the facilities were capable of handling an additional 200 players per day without any changes except the hiring of an additional starter on Tuesdays. The daily rate for a starter was $2.00. After some debate the owners concluded a group contract with the industrial company at a rate of 15 cents per player.

Exhibit 2

AVERAGE COST PER PLAYER, 1935–36

Depreciation (buildings, machinery, etc.)	$0.0527
Labor (5 maintenance employees)	0.0833
Labor (golf professional, mechanics, administrative)	0.0151
Taxes and insurance (property, compensation, liability)	0.0092
Material and supplies (including water)	0.0517
Occasional labor	0.0017
Total	$0.2137

Not long afterwards four other companies indicated a willingness to sign similar group contracts for other days of the week, but at rates of 10 cents per player. Each of these proposed contracts would provide a minimum guarantee of 150 players.

The manager believed that, when the average number of players using the course rose much above 1,000 per week, an additional full-time maintenance worker would be required and that additional expenses for materials and supplies would be encountered. He estimated these additional expenses at $55.00 per week.

QUESTIONS

1. Was the director justified in objecting to a rate of 15 cents per player for the group contract accepted by the Waring Club?
2. Should the owners have entered into additional group contracts with the four other companies at 10 cents per player?
3. If competing clubs reduced *regular* weekday rates to 15 cents, could the Waring Golf Club profitably accept *regular* business at this price?

Case III-3: DRYBAK CORPORATION

The Drybak Corporation manufactured men's trousers, coats, and vests for hunting, work, and other uses. Its production was about equally divided between goods made for stock and those made to order for the customer. Its output included about 250 different items, but constant changes in design meant that the line as a whole was continuously shifting. Individual production orders were small, and at any one time there were many different orders in process. For this reason the company used the job-lot method of manufacturing. The company operated only one plant, which normally required a force of 350 employees.[1]

Originally, the company used a costing system which accumulated historical costs by job orders. Subsequently, it developed a standard cost system for purposes of pricing, production planning, cost control, budgeting, and valuation of inventory. The latter system had been developed gradually over a period of fourteen years.

The standard costs were based on an analysis of material requirements, labor operations performed, and the overhead applicable. Since the garments to be made for any one order usually differed in some respects from any made previously, a different combination and sequence of manufacturing operations was required for each product. But these processes were widely used in many types of garment manufacture, and the operating characteristics of the equipment used were known. Consequently, it was usually possible to set reliable costs, based on past experience, for the particular combination of operations involved in making any specific garment.

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[1] This case is adapted from the N.A.C.A. *Bulletin*, Vol. XXX (December 15, 1948), Research Series No. 15, "A Standard Cost Case Study".

In determining standard costs for a garment, the company based its calculations on an average size. Thus coats ranging in size from 37 to 49 would have a standard cost based on the average size, which might be size 43. Variations in costs might occur on individual orders because of a heavier demand for larger or smaller sizes, but in the long run the company believed these variations would average out.

When the company received an order, the manufacturing data sheet (Exhibit 1), based on a dozen garments, was made up. The description and the material quantity standards were shown on the front of the sheet, and on the back were listed the operations to be performed and the standard allowed hours required. The information on this sheet was then carried over to the standard cost record sheet (Exhibit 2) on which the standard cost was developed by costing the materials and labor at standard rates.

The material quantity standards for the major materials of the garment were determined by the use of templets or patterns designed for the average size chosen. These templets were arranged to give the best usage of the material, and the standard yardage was determined from these areas plus an allowance for end pieces and lappings.[2] Standard quantities for the miscellaneous items of material, such as buttons, zippers, tags, purchased pockets, etc., were obtained by inspection of the garment.[3] The standard material quantities were transferred from the manufacturing data sheet to the standard cost sheet (Exhibit 2), where they were multiplied by standard prices. Standard material prices were determined by an annual forecast of the cost of material to be purchased, tempered by the inventory on hand at the time that the forecast was made.

The labor operations to be performed on the garment were determined by careful analysis of the laying-out of templets, the material cutting and trimming, the sewing, pressing, inspecting, etc. By studying these operations in the light of recorded motion and

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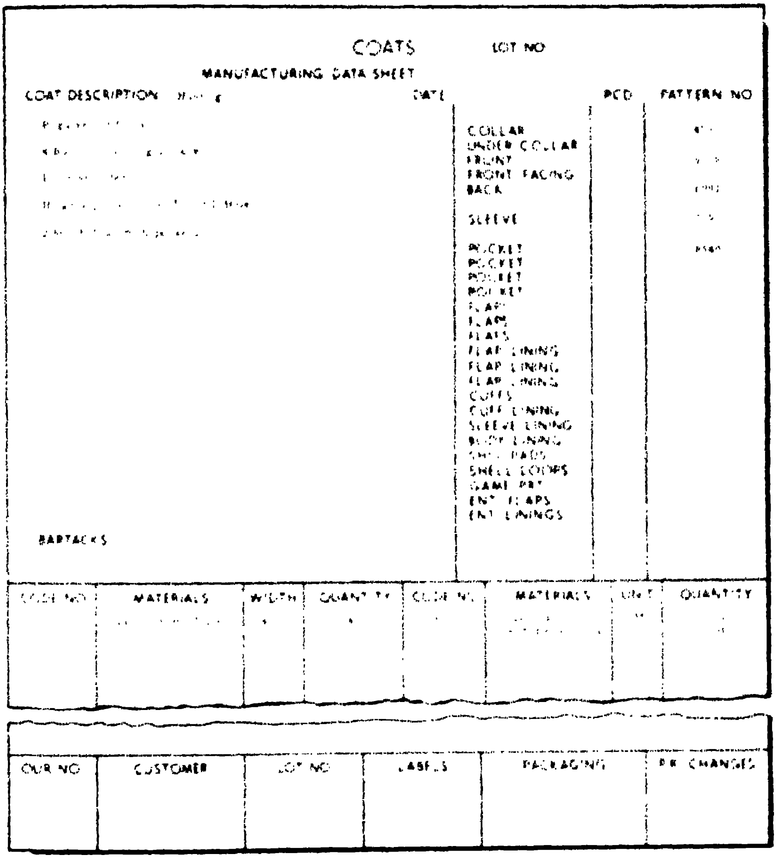
[2] This standard is shown on the lower left-hand side of Exhibit 1.

[3] These were listed on the lower right-hand side of the data sheet (Exhibit 1).

Exhibit 1

MANUFACTURING DATA SHEET



COATS LOT NO

MANUFACTURING DATA SHEET

COAT DESCRIPTION

DATE

	PCD	PATTERN NO
COLLAR		
UNDER COLLAR		
FRONT		
FRONT FACING		
BACK		
SLEEVE		
POCKET		
POCKET		
POCKET		
POCKET		
FLAPS		
FLAPS		
FLAPS		
FLAP LINING		
FLAP LINING		
FLAP LINING		
CUFFS		
CUFF LINING		
SLEEVE LINING		
BODY LINING		
SHLD. PADS		
SHELL LOOPS		
GAME PKT		
ENT FLAPS		
ENT LININGS		

BARTACKS

CODE NO	MATERIALS	WIDTH	QUANTITY	CODE NO	MATERIALS	UNIT	QUANTITY

OUR NO	CUSTOMER	LOT NO	LABELS	PACKAGING	PR CHANGES

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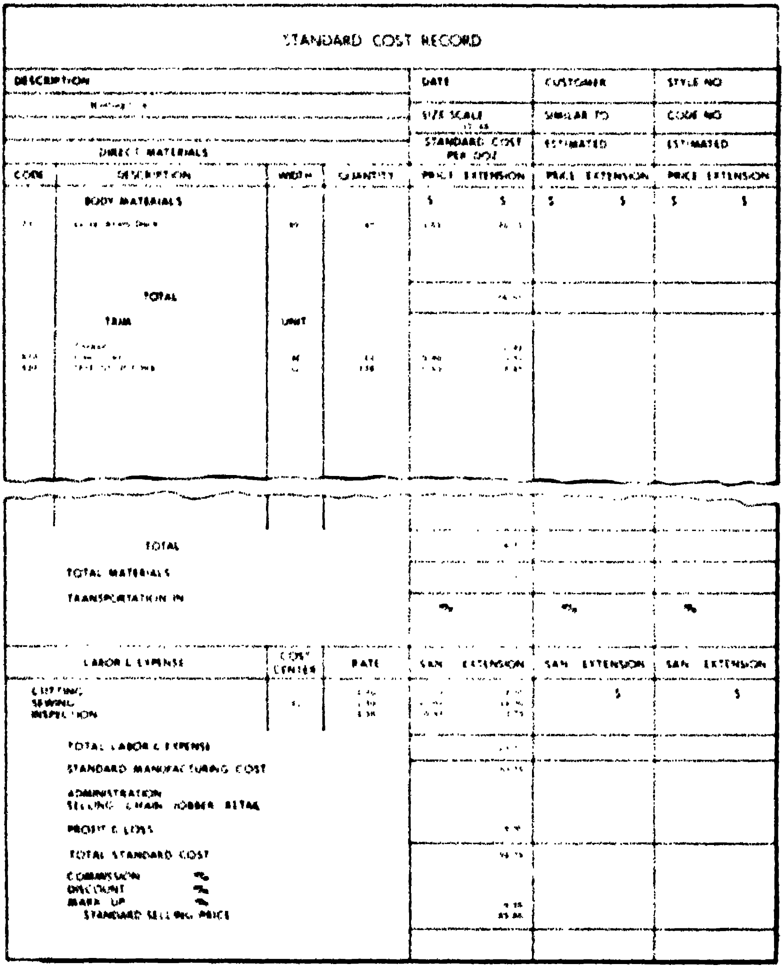
time study data, standard times could be determined and entered on the standard cost record sheet. Standards set by this method for pricing purposes were temporary but were used until additional orders were received. Then they were revised by a study of the actual time on the previous order.

Operation time standards were summarized in standard hours for each of three departments: cutting, sewing, and inspection. The time to process a dozen garments of the specified design in each

Exhibit 2

STANDARD COST RECORD SHEET



STANDARD COST RECORD

DESCRIPTION
DATE
CUSTOMER
STYLE NO
SIZE SCALE
SIMILAR TO
CODE NO
STANDARD COST PER DOZ
ESTIMATED
ESTIMATED
DIRECT MATERIALS

CODE	DESCRIPTION	WIDTH	QUANTITY	PRICE EXTENSION	PRICE EXTENSION	PRICE EXTENSION
	BODY MATERIALS			$ $	$ $	$ $
	TOTAL					
	TRIM	UNIT				
	TOTAL					
	TOTAL MATERIALS					
	TRANSPORTATION IN			%	%	%

LABOR & EXPENSE	COST CENTER	RATE	SAH EXTENSION	SAH EXTENSION	SAH EXTENSION
CUTTING SEWING INSPECTION				$	$
TOTAL LABOR & EXPENSE					
STANDARD MANUFACTURING COST					
ADMINISTRATION SELLING (CHAIN, JOBBER, RETAIL)					
PROFIT & LOSS					
TOTAL STANDARD COST					
COMMISSION % DISCOUNT % MARK UP % STANDARD SELLING PRICE					

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department was then entered on the standard cost record (Exhibit 2) and multiplied by the standard hourly rate for labor and overhead expense combined. The standard labor rate was the average rate being paid at the time the standard was set.

Standard hourly overhead rates for each department were determined by dividing the standard allowed hours at the practical production capacity[4] of the department into the budgeted overhead expense for the department at capacity. Overhead costs were computed through the use of flexible budgets. The budget for each department contained only those expenses which were controllable by the executive in charge of the department. These expenses were composed principally of labor, machine parts, and materials, which were accounted for as indirect charges to product but which were directly chargeable to the specific department. These amounts constituted the *departmental* overhead charge.

To the departmental overhead was added prorated general plant overhead. This included such items as power, light, office expense, vacation pay, depreciation, etc. These were separately budgeted.

Finally, selling, administrative, and other expenses were applied to the job, by means of standard rate *times* the manufacturing cost. This rate was derived from another flexible budget similar to those for departmental and general overheads. In this budget, sales dollars instead of standard allowed hours were used to measure activity.

The standard cost sheet was completed by adding the mark-up to the cost to determine the selling price.

QUESTIONS

1. Discuss the conditions which might make standard costs depart from "actual" unit costs of any one order.
2. As a basis for pricing, would the standard cost system of the Drybak Corporation be more satisfactory in periods when there were large backlogs of unfilled orders or in periods when the plant was operating at less than full capacity?

Case III-4: AIR-FREIGHT RATES

On October 15, 1944, American Airlines inaugurated an air-freight service in addition to its carriage of passengers, mail, and express. By January, 1946, several other air lines engaged in the transportation of passengers, mail, and express had also entered the field. These carriers were licensed by the Civil Aeronautics Board to fly regularly scheduled trips between designated points and were known as "certificated carriers." Initially they carried freight only in the same aircraft as passengers, mail, and express; but subsequently the larger lines, such as American Airlines, United Air Lines, TWA, and Pennsylvania Central Airlines instituted the use of all-cargo planes in which no passengers were carried. These aircraft made regularly scheduled flights, as permitted in the certificate of the carrier, and frequently carried mail and express as well as freight cargo.

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[4] That is, the total number of hours which *could* be worked by the department in a given period if there were enough orders to keep it busy.

After July, 1945, a number of noncertificated carriers were organized and began to compete with the certificated carriers for air-freight traffic.[1] On August 1, 1947, the Civil Aeronautics Board set up a classification of non-certificated cargo carriers which permitted these new air-freight companies to operate on a scheduled basis as common carriers. The C.A.B. also required them to file tariffs and reports. In this group Slick Airways, Inc., California Eastern Airways, Air Cargo Transport, Inc., and The Flying Tiger Line transported the largest share of the total volume of traffic carried by this group.

The rates set up by American Airlines on October 15, 1944, established a system of class and specific commodity rates and applied these rates on a mileage block basis. For the four classes of commodities, A, B, C, and D, the distance charges were 50, 43, 36.5, and 30 cents per ton-mile, respectively, all rates including pickup and delivery service. With minor variations, the other certificated carriers followed the same system of tariffs, except that some tariffs were lower than that of the American Airlines. Upon the entry of the United Air Lines into the air-freight business on February 1, 1946, its tariffs eliminated the four classes of commodities and set up instead a single general commodity class with graduated rates according to weight classification, to which the rates shown in Exhibit 1 applied. Other carriers soon made adjustments to meet the rates and terms of United Air Lines. Effective July 15, 1946, Pennsylvania Central Airlines filed a tariff quoting lower rates than competitors except on quantity shipments. TWA followed shortly in a partial rate adjustment to meet competition of Pennsylvania Central Airlines.

The noncertificated carriers soon began to compete vigorously in the air-freight market. In February, 1946, Air Cargo Transport announced a schedule of rates which varied with the weight of shipments. The ton-mile rates as advertised were 22 cents for shipments of 1,000 pounds, 21 cents for 4,000 pounds, and 20 cents for 5,000 pounds. As the number of companies in the noncertificated group increased, rates were gradually reduced. The average revenue per ton-mile flown by Slick Airways in the months of March, April, May, and June, 1946, was 20.1, 16.1, 17.5, and 13.6 cents, respectively.[2]

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[1] Prior to August 1, 1947, noncertificated carriers were not required to file tariffs with the Civil Aeronautics Board. They were not certificated to fly on a schedule basis but made irregular flights at rates negotiated with each individual shipper.

The certificated carriers made adjustments to meet the competition of the noncertificated carriers, and, on August 1, 1947, a consolidated tariff was filed on behalf of all the certificated trunk-line carriers.[3] In this tariff the basic ton-mile rate was again lowered, the 100-pound rates being constructed on a basis of 20 cents per ton-mile, as compared to 26.5 cents per ton-mile in earlier tariffs. This tariff, with minor exceptions, brought about lower rates on all commodities. On the same date Slick Airways, a noncertificated carrier, filed a tariff with rates between New York and other principal cities served by it from 12 to 39 per cent lower, according to weight, than rates shown in the consolidated tariff of the certificated carriers. Other noncertificated carriers filed tariffs early in August similar to that of Slick Airways. On October 5, 1947, American Airlines, PCA, and United Air Lines, which competed actively with the noncertificated carriers, filed specific commodity tariffs which were not on a uniform basis but approximated 13.8 cents per ton-mile on shipments from New York to Chicago and 12.8 cents per ton-mile from New York to Los Angeles. These rates were lower than those of the noncertificated carriers on shipments weighing between 100 and 999 pounds. TWA met this reduction of rates in part. United also filed a

Exhibit I

GRADUATED RATES QUOTED BY UNITED AIR LINES, INC., EFFECTIVE FEBRUARY 1, 1946

Weight Group (Pounds)	Rate Base Per Ton-Mile Cents	Percentage of 100 Lb. Rate
100–499	26.5	100.0
500–999	25.6	96.6
1,000–1,999	24.7	93.2
2,000–2,999	23.0	86.8
3,000 and over	21.2	80.0

Source: H. W. Torgerson, "History of Air Freight Tariffs," *Journal of Air Law and Commerce* (winter, 1948), 50. All rates are airport to airport.

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[2] H. W. Torgerson, "History of Air Freight Tariffs," *Journal of Air Law and Commerce* (winter, 1948), p. 52.

[3] This tariff consisted of three parts: (1) a rules tariff, (2) a pickup and delivery tariff, and (3) a rate tariff. This tariff had the effect of making the tariffs of the various participating certificated carriers more uniform.

new tariff, effective October 25, 1947, giving substantial reductions; in this it was joined by some of its competitors among the certificated carriers.

Upon petition of Slick Airways and the Independent Air Freight Association, Inc., the C.A.B. halted these rate reductions by suspending the supplemental tariffs of United, Inland, Southwest, Western, and TWA and also the specific commodity rates of PCA, TWA, and American, with some qualifications. The C.A.B. then ordered an investigation of these tariffs and the tariffs filed by ten noncertificated cargo carriers. The board stated that the purpose of this investigation was "to attempt to develop some national principles for tariff-making in air transportation as well as to inquire into the validity of the tariffs that have been filed."[4] To carry out its inquiry the board required all carriers of both types to submit briefs and exhibits supporting their tariffs.

Exhibit 2

ESTIMATED ANNUAL TRAFFIC VOLUME (NOW PRIMARILY SURFACE-BORNE) WHICH WOULD BECOME AVAILABLE AT RATES INDICATED

Rate Per Ton-Mile (Cents)	*Ton-Miles (Millions)*	*Rate Per Ton-Mile (Cents)*	*Ton-Miles (Millions)*
35	30	15	800
30	60	12	3,550
25	100	10	5,000
20	200	8	7,400

Source: *Exhibit SA-4B-Exhibits of Slick Airways, Inc.* (C.A.B. Docket No. 1705 *et al.*), p. 13.

Although the arguments presented in these briefs indicated a sharp difference of opinion over the question of costs for the purpose of rate making, the revenue aspects of the problem were not neglected. Exhibits 2 and 3 show estimates of the relationship between rates and volume of traffic as air-freight rates approach the level of surface rates. "Expert economic witnesses who appeared for the various parties generally agreed that in transportation history, each new form of transportation which has persisted offered services and rates which were able to (1) divert some traffic from older transportation systems, and (2) create new traffic. Air freight, in its genesis, has shown such propensities."[5] In addition, representatives of several carriers pointed out that it might be necessary at times to quote rates below cost in order to develop traffic.

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[4] Torgerson, *op. cit.*, p. 61

[5] *Examiner's Report* (C.A.B. Docket No. 810, *et al.*), p. 236.

The certificated carriers tended to treat the transportation of freight as a by-product of their main operations in the transport of passengers, mail, and express. The noncertificated carriers, on the other hand, transported freight as their main and only product. Although all certificated carriers were requested to present an exhibit showing both revenues and expenditures pertaining individually to passenger, mail, express, and freight service, only one carrier, Braniff Airways, submitted such an exhibit. The remaining companies stated that lack of information and time prevented them from presenting an accurate statement. The statement of Braniff Airways is shown in Exhibit 4.

Exhibit 3

ESTIMATES OF FRESH FRUITS AND VEGETABLES WHICH WOULD BE MOVED BY AIR FREIGHT AT RATES INDICATED

Rate per Ton-Mile (Cents)	*Ton Miles*	*Rate per Ton-Mile (Cents)*	*Ton Miles*
15	24,419,000	5	967,711,000
10	63,714,000	3	4,018,743,000
7	333,127,000		

Source: Spencer O. Larsen, *Wayne University Studies in Air Transport* No. 1, p. 5. Based on historical movements of 1941

The noncertificated carriers served primarily a few large cities on the east and west coasts. Slick Airways served regularly eleven principal points, California Eastern served seven, and the Flying Tigers eight. The certificated carriers, on the other hand, served a substantially larger number of cities; American Airlines, for example, provided all four of its services to 65 cities broadly distributed over the United States. United Air Lines, similarly, covered a wide geographic area. PCA and TWA served a smaller number over a somewhat more restricted geographical area. The distance factor was greater for the noncertificated than for the certificated carriers. Average load was also greater in the noncertificated carriers than in the certificated. Both distance and weight factors are shown in Exhibit 5. These factors, which affected the costs of carrying freight, became one of the principal points of dispute between the two groups of carriers as to the nature of certain costs.

The certificated carriers based their main argument upon the

Exhibit 4

BRANIFF AIRWAYS, INC., REVENUES AND EXPENSES FOR QUARTER-YEAR ENDED SEPTEMBER 30, 1947

Showing Direct Distribution to Services Affected and to Proration "Pools"

Description	Total	Passenger	Mail	Express	Freight	Allocable to All Cargo	Balance Allocable to All Services
Operating revenues:							
Passenger	$2,779,168	$2,779,168					
Mail	112,832		$112,832				
Express	78,495			$78,495			
Freight	26,299				$26,299		
Excess baggage	25,875	25,875					
Other (including charter)	40,739	24,661			8,673		$ 7,405
Totals	$3,063,408	$2,829,704	$112,832	$78,495	$34,972		$ 7,405
Operating expenses:							
Flying operations	746,259	4,648			2,426		739,185
Flying maintenance	366,911	2,400			1,453		363,058
Flying depreciation	370,432	3,301			1,483		$ 365,648
Total direct flying	$1,483,602	$ 10,439			$ 5,362		$1,467,891
Ground operations	464,601	2,017	933		523	$66,631	394,497
Ground indirect maintenance	245,502						245,502
Passenger service	246,030	246,030					
Traffic and sales	357,463	307,361	684		1,102		48,316
Advertising and publicity	73,442						73,442
General and administrative	218,469	15,826	852		1,436	1,178	199,177
Ground equipment, depreciation	42,615	14,038	305		622	657	26,993
Total operating expense	$3,131,724	$ 595,621	$ 2,774		$ 9,045	$68,466	$2,455,818
Net operating profit or loss	68,316*	2,234,083	110,058	$78,495	25,927	68,466*	2,448,413

* Loss.

Source: *Exhibit No. B-4*, p. 1 *Exhibits of Braniff Airways, Inc.* C.A.B. Docket No. 1705, *et al.*

Exhibit 5

AVERAGE WEIGHT, AVERAGE LENGTH OF HOP, AND AVERAGE LENGTH OF SHIPMENT FOR SELECTED CERTIFICATED AND NONCERTIFICATED CARRIERS

Carrier	Average Weight per Shipment, Tons, Week of Sept. 7, 1947	Average Length of Hop in Miles, Week of Sept. 7, 1947	Average Length of Shipment in Miles, Third Quarter, 1947
Certificated:			
American	0.0736	*	900†
United	0.0776	291.9	1,030†
PCA	0.1179	140.5	345
Braniff	0.0443	161.2	557
TWA	0.0820	265.4	1,178
Noncertificated:			
Slick	0.1361	740.2	2,069.1
Flying Tiger	0.4431	1,341.8	1,837.7
Calif.-Eastern	0.3767	712.9	2,101.0
Air Cargo	1.5284	*	564.2

* Not available.
† Estimated.

Sources: *Average Weight per Shipment*, Exhibit PC [illegible] (C.A.B. Docket No. 1705 et al.), January 20, 1948; *Average Length of Hop*, Exhibit PC [illegible] (C.A.B. Docket No. 1705 et al.), February 20, 1948; *Average Length of Shipment*, Exhibit PC [illegible] (C.A.B. Docket No. 1705 et al.), January 20, 1948).

principle of "out-of-pocket" costs directly attributable to the provision of air-freight service. In their arguments before the C.A.B. they pointed out that, because their aircraft provided regularly scheduled flights for the carriage of passengers, mail, and express and because there was adequate unused capacity in these carriers, it was not necessary to include as costs of freight service any expenses for flying operations, depreciation of flying equipment, and ground operations which would be carried on even if there were no freight service. Exhibit 6 shows the average monthly utilization of this space by Amer-

Exhibit 6

AVAILABLE FREIGHT SPACE AND PERCENTAGE UTILIZATION ON COMBINATION AIRCRAFT FOR AMERICAN AIRLINES, UNITED AIR LINES, AND TWA FOR THE FIRST TEN MONTHS OF 1947

Carrier	Available Space (Ton-Miles)	Ton-Miles of Freight Carried	Percentage Utilized
American	76,692,230	6,870,096	8.95
United	60,828,015	3,351,723	5.51
TWA	40,374,432	2,000,152	4.97
Average			6.87

Source: Brief of Public Counsel to C.A.B. (C.A.B. Docket No. 1705 et al., March 22, 1948), p. 30.

ican, United, and TWA, for the ten-month period ending October 31, 1947.

Several factors were emphasized which affected the percentage utilization of this space.

> Since [freight] cargo moves primarily between 9 P.M. and 9 A.M., most available space on combination planes during the period 9 A.M. to 9 P.M. is not commercially usable. . . . During the period between 9 P.M. and 9 A.M. United originated 65 per cent of its freight from its major stations. . . . Since cargo moves primarily on week days, a large proportion of the space flown on week ends is not commercially usable. The testimony of PCA shows that 70 per cent of its cargo is carried Tuesday through Friday. . . . United's calculations do not relate the available space to the place where the cargo demand exists. If there is a cargo demand at Chicago, tonnage available on combination planes at Reno is not commercially usable space. . . . When the directional flow of cargo is considered, a large proportion of cargo space on combination planes is not commercially usable. Exhibits of United show that 82 per cent of United's cargo is westbound and only 18 per cent eastbound. . . . For the certificated carriers as a whole the eastbound traffic was only 37.6 per cent of the westbound.[6]

There are shown in Exhibit 7 comparative costs of freight service for selected certificated and noncertificated carriers. The column headed "Carriers' Estimate" is the approximate out-of-pocket cost to the certificated carriers for the transportation of air freight. These estimates do not include an allocation of expenditures for personnel, facilities, and equipment at stations where passenger, mail, express, and freight traffic are handled jointly. It was noted in the hearings:

> These added cost arguments appear valid with respect to station personnel, facilities and equipment at any point where traffic volume is low, that is, where all traffic can be handled by the minimum staff, and even where greater volume would require additional clerks and handlers, some economy might conceivably be realized by having the station manager take on the added supervisory work. But when the larger traffic points are considered, the argument loses force—as freight traffic grows in volume the relative amount that can move in combination as opposed to all-cargo equipment will become less. A considerable all-cargo operation at any point will make necessary separate freight terminal handling and loading facilities, perhaps at a different airport than is used for passenger flights. Rather than acquire additional space for freight reservation employees at the relatively expensive locations used for passenger sales, they will doubtless be located in less costly space, probably

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[6] *Brief of United Airlines, Inc., before the Civil Aeronautics Board, March 22, 1948*, pp. 33–36, *passim*.

Exhibit 7

COMPARATIVE COSTS OF FREIGHT SERVICE IN CENTS PER AVAILABLE TON-MILE AND PER ADJUSTED REVENUE TON-MILE FOR SELECTED CERTIFICATED AND NONCERTIFICATED CARRIERS

Carrier	Available Ton-Miles			Adjusted Revenue Ton-Miles			Carriers' Estimate Other Ground and Indirect Expense Applicable to Freight
	Air Operating Expense	Ground and Indirect Maintenance Expense	Other Ground and Indirect Expense	Air Operating Expense	Ground and Indirect Maintenance Expense	Other Ground and Indirect Expense	
Certificated:							
American	11.98	2.50	9.40	19.30	1.03	15.15	5.44
Braniff	14.91	2.47	9.47	24.40	1.04	15.50	2.46
PCA	13.26	2.12	10.00	25.41	1.06	19.14	5.67
TWA	13.14	3.07	9.82	20.71	1.83	15.48	5.91
United	11.56	1.85	9.61	18.26	2.93	18.27	9.80
Average	12.74	2.35	9.20	21.72	1.01	15.83	
Noncertificated:							
Air Cargo	10.67	0.79	5.75	15.65	1.16	8.43	
California-Eastern	5.89	0.13	3.66	10.71	0.24	6.65	
Flying Tiger	9.30	0.40	3.85	12.78	0.56	5.29	
Slick	5.81	0.74	1.86	7.26	0.02	6.06	
Willis	6.82	1.30	2.69	16.95	3.24	6.69	
Average	6.67	0.55	4.21	9.92	0.82	6.27	

Source: *Exhibits PC-388A–388B, Public Counsel's Exhibits*, C.A.B. Docket No. 1705 *et al.*, January 20, 1948.

at the freight terminal. As traffic grows, a fairly complete segregation of passenger and freight operations will follow. Any appreciable physical separation of passenger and freight loading points would tend to reduce the practicability of using passenger-plane space for air freight. Thus, while there is found some merit in the added cost presentation of the carriers, as traffic increases it is foreseen that the operations at major points will closely resemble those of an independent all-cargo operator. As to station costs at relatively small traffic points the argument will probably remain valid as against a conventional operation serving property only.[7]

In one instance American Airlines estimated the cost of carrying freight in combination planes at 2.1 cents per ton-mile,[8] while National Airlines estimated its total cost of freight transportation at $6.54, the cost of printing weighbills.[9] It was the use of these costs as the lower limit to air-freight rates to which the noncertificated carriers objected.[12] They claimed that the certificated carriers, on the basis of out-of-pocket costs, were charging rates below the cost of service and were engaging in unfair competition. The noncertificated carriers contended that some of the flying, depreciation, and maintenance costs should be charged to the carriage of freight. They further claimed that, because of air-mail payments, the certificated carriers could fly freight at lower rates and compensate themselves for any deficits by petitioning for an increase in mail payments.[13] The certificated carriers denied this and in their defense argued that any such revenue from air-freight service over and above their out-of-pocket costs *reduced* their need for air-mail subsidy.

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[7] *Examiner's Report* (C.A.B. Docket No. 810 *et al.*), pp. 245–46.

[8] *Examiner's Report* (C.A.B. Docket No. 1705 *et al.*), p. 252.

[9] N. 66, p. 48, *Brief of Public Counsel to C.A.B.* (C.A.B. Docket No. 1705), pp. 32–48.

Public counsel of the C.A.B. raised the question of the future of the air-freight business. It was pointed out that in the first nine months of 1947, 70 per cent of all revenue-ton-miles of freight was carried in all-cargo planes. Only 31.7 per cent of the revenue-ton-miles of freight carried by certificated carriers was, however, carried in all-cargo planes.[14] Witnesses for both certificated and noncertificated carriers were confident that the air-freight industry was at the beginning of a long period of great growth. All parties concerned were asked to estimate their 1948 freight ton-miles. The total of these estimates compared to the actual experience of previous years is shown in Exhibit 8. In determining the future relative importance of the all-cargo plane and the combination plane, it was recognized that the important element was not the growth of freight traffic *per se* but its growth relative to passenger traffic. If the freight traffic in

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[12] For the quarter ended September 30, 1947, Capital Airlines reported that the total revenues per ton-miles for its all-cargo operations as 65.19 cents. For this same quarter, direct flying costs were 68.38 cents per ton-mile and indirect costs were 6.3 cents per ton-mile, making a total of 75.49 cents total costs per ton-mile. The total loss on operations of all cargo equipment amounted to $10,958 based on the 108,393 miles flown. Capital Airlines had operating revenues of $110,503 from carrying freight on its combination airplanes, on the basis of 437,840 ton-miles of freight on combination planes at a cost of 6.3 cents per mile, total cost of freight on combination aircraft amounted to $27,585, leaving a profit of $82,918 from freight operations on combination planes. Subtracting the loss on all-cargo freight operations leaves a net profit of $71,960 for all freight operations of Capital Airlines. Owing to a substantial increase in volume, attributed to lower rates, Capital Airlines showed a net profit on its all-cargo, as well as its combination, operations of freight service for the months of October and November, 1947.

[13] "In determining the [air-mail] rate in each case, the Authority shall take into consideration among other factors . . . the need of each such carrier for compensation for the transportation of mail sufficient to insure the performance of such service, and together with all other revenue of the air carrier, to enable such carrier under honest, economical and efficient management, to maintain and continue the development of air transportation to the extent and of the character and quality required for the commerce of the United States, the Postal Service, and the National Defense." (Civil Aeronautics Act of 1938, Sec. 406 [b]).

[14] *Brief of Public Counsel to C.A.B., March, 22, 1948*, pp. 22–23.

Exhibit 8

AIR FREIGHT CARRIED 1945–47, AND ESTIMATES FOR 1948, ALL CARRIERS

Year	*Freight Carried, Revenue Ton-Miles*	*Percentage Increase over Previous Year*	*Year*	*Freight Carried, Revenue Ton-Miles*	*Percentage Increase over Previous Year*
1945	3,189,106		1947	82,739,186	100
1946	41,451,956	1,200	1948 (estimated)	208,705,703	152

Exhibit 9

GROWTH OF PROPERTY TRAFFIC* COMPARED TO PASSENGER TRAFFIC, 1938–47†

Year	Comparison by Revenue Ton-Miles		Comparison by Percentage (1938 = 100)	
	Property‡	Passengers§	Property	Passengers
1938	2,173,134	47,560,000	100.00	100.00
1939	2,704,837	67,975,000	124.47	142.93
1940	3,464,681	104,713,100	159.43	220.17
1941	5,240,867	137,715,200	241.17	289.56
1942	11,728,747	140,583,500	539.72	295.59
1943	15,139,359	161,713,000	696.66	340.02
1944	16,411,299	216,713,000	755.19	454.38
1945	22,104,306	333,627,800	1,017.16	701.49
1946	65,103,622	572,963,194	2,995.84	1,204.72
1947	111,209,749	579,621,516	5,117.48	1,218.72

* Includes both freight and express. Prior to July, 1945, freight and express statistics were reported together. Although reported separately since then, they have been combined to make the data comparable.

† Includes 16 certificated carriers from 1938 to date, plus 9 all-freight carriers from the time of their entrance into service during 1945–46.

‡ Converted from pound-miles to ton-miles for period 1938 to June 1945.

§ Converted from passenger miles to ton-miles on basis of *200* pounds per passenger for years 1938–47.

Source: *Annual Airline Statistics, Domestic Carriers and Recurrent Reports*, Appendix D, p. 2 (*Public Counsel Brief to C.A.B.*, C.A.B. Docket 1705 *et al.*, March 22, 1948).

the future were to grow much more than the passenger business, then the trend would be toward a proportionately greater use of all-cargo planes.[13] Exhibit 9 shows the growth of property traffic compared to passenger traffic since 1938.

[13] Testimony of Mr. C. R. Smith, chairman of the board, American Airlines, Inc.:

"*Question*: Mr. Smith, in American's future thinking about air freight, do you anticipate that most of the freight in the future will be carried in combination aircraft or in all-cargo type?

"*Answer*. I think the trend will be toward carrying a higher proportion than now in all-freight planes. In other words, we are definitely proposing to add additional all-freight planes to our service . . . and the bulk of the tonnage will be carried in all-freight planes."

Testimony of Mr. Moore of United Air Lines:

"*Question*. In view of this trend [toward all cargo-planes] on United's system, would it be fair to say that the all-cargo plane will assume an increasing importance in the carriage of freight by United?

"*Answer*: If you are looking into the ultimate future, I think yes." *Brief of Public Counsel to C.A.B.* (C.A.B. Docket No. 1705 *et al.*, March 22, 1948), p. 28.

Public counsel of the C.A.B., however, stated that "the combination plane has a definite place in the freight field. It enables combination carriers to provide an expedited around-the-clock service which benefits some shippers. It also enables the carriers to serve small towns where the operation of all cargo planes would not be economically feasible."[14]

QUESTIONS

1. Do you agree with the position of the certificated carriers concerning costs of carrying air freight in combination planes?
2. Exhibit 4 shows that only a small share of total expenses is attributable directly to passenger traffic. Would the reasoning of the certificated carriers with regard to air freight apply with equal force to passenger traffic?
3. Does the cost structure of the noncertificated carriers make them more sensitive than the certificated carriers to rate changes?
4. From the standpoint of the national interest in developing improved transportation, what costs presented in this case are significant?

[14] *Ibid.*, p. 36.

Long-Run Variations in Cost

Case III–5. UNITED STORES CORPORATION[1]

The United Stores Corporation operated more than 1,000 small department stores throughout the United States. Most of the stores were located in cities and towns of less than 50,000 population. The merchandise carried was men's, women's, and children's clothing, dry goods, notions, and miscellaneous items of wearing apparel and general merchandise. No furnishings or appliances were handled. All sales were for cash except a comparatively small volume of sales to institutions.

Organized in 1900, the United Stores Corporation had acquired numerous store units by purchase in the period to 1930. Thereafter, the increase in number of operating units went forward more slowly and chiefly by organization of new units instead of through purchase. In the earlier years stores had been operated chiefly in small and medium-sized towns, but in recent years the corporation had opened units in many large cities.

In the spring of 1949 the management of United was faced with a decision regarding the size and location of new store units. The corporation had strong cash resources and no funded debt. Ample

[1] Fictitious name.

Exhibit 1

OPERATING DATA FOR DEPARTMENT STORES WITH SALES VOLUMES IN EXCESS OF $1,000,000 (1948)

Net Sales* (In Thousands)	Items	Population Groups (In Thousands) 15–25	25–50	50–100	100–250	250–500	500–1,000	1,000 or More
$1,000–2,000	Number of reports	9	17	7				
	Change in sales (1948/1947)	102.5	104.5	104.0				
	Rate of stock-turn†	4.3	4.7	5.6				
	Gross margin	34.8%	34.8%	35.5%				
	Total expense	29.7	28.5	30.6				
	Total payroll	16.2	16.5	16.6				
	Real estate costs	2.6	2.45	3.2				
	Advertising	2.05	2.2	3.0				
	Delivery expense ‡	0.3	0.45	0.65				
	Net gain before taxes §	7.5	8.4	[illegible]				
$2,000–5,000	Number of reports		15	18	14			
	Change in sales (1948/1947)		107.0	107.0	106.5			
	Rate of stock-turn†		5.3	4.5	5.2			
	Gross margin		35.7%	35.6%	35.8%			
	Total expense		28.4	29.9	29.7			
	Total payroll		16.3	17.0	15.6			
	Real estate costs		1.9	2.2	3.0			
	Advertising		2.45	2.5	2.9			
	Delivery expense ‡		0.5	0.75	0.9			
	Net gain before taxes §		9.4	7.5	8.0			
$5,000–10,000	Number of reports			16	20	7		
	Change in sales (1948/1947)			108.5	104.0	106.0		
	Rate of stock-turn†			5.2	5.25	4.0		
	Gross margin			34.6%	35.9%	36.1%		
	Total expense			26.9	30.6	33.0		
	Total payroll			15.4	17.1	18.2		
	Real estate costs			2.1	2.7	3.1		
	Advertising			2.4	2.6	3.5		
	Delivery expense ‡			0.7	0.7	1.0		
	Net gain before taxes §			8.5	7.5	3.5		
$10,000–20,000	Number of reports				8	25	16	
	Change in sales (1948/1947)				106.0	106.0	104.5	
	Rate of stock-turn†				5.0	5.0	5.0	
	Gross margin				35.6%	35.9%	35.4%	
	Total expense				30.6	31.4	33.1	
	Total payroll				16.2	17.3	17.3	
	Real estate costs				3.1	2.6	2.6	
	Advertising				2.6	2.8	3.4	
	Delivery expense ‡				1.15	1.15	1.5	
	Net gain before taxes §				7.2	6.7	4.5	
$20,000–50,000	Number of reports					12	10	
	Change in sales (1948/1947)					109.0	105.0	
	Rate of stock-turn†					5.5	5.2	
	Gross margin					35.3%	36.5%	
	Total expense					30.2	32.3	
	Total payroll					16.4	18.3	
	Real estate costs					2.4	2.05	
	Advertising					2.3	2.45	
	Delivery expense ‡					1.0	1.3	
	Net gain before taxes §					7.5	6.7	
$50,000 or More	Number of reports							11
	Change in sales (1948/1947)							105.5
	Rate of stock-turn†							5.7
	Gross margin							35.5%
	Total expense							31.0
	Total payroll							17.45
	Real estate costs							2.0
	Advertising							2.35
	Delivery expense ‡							1.75
	Net gain before taxes §							6.75

* Net sales = 100%, where applicable.

† Times a year, based on beginning and ending inventories.

§ Federal income taxes.

‡ Delivery expense includes delivery payroll (also included in total payroll), delivery service purchased, parcel post on merchandise to customers, and cost of operating owned delivery equipment. However, by virtue of the functional division of expense recommended in the NRDGA *Expense Accounting Manual*, this item is slightly understated to the extent that firms which make deliveries in their own trucks include in the administrative and general and occupancy functions certain charges, such as pensions, payroll taxes, and garage rent, which might be considered allocable to delivery costs.

NOTE: Some of the reports covered the operations of more than one store. In such cases, the population of the city in which the main store was located was used in classifying the reports by size of city.

Source: Malcolm P. McNair, *Operating Results of Department and Specialty Stores in 1948* (Boston: Harvard University Graduate School of Business Administration, 1949), p. 49. Reproduced by permission.

profits in the postwar period made it possible to expand the organization through reinvestment of earnings. One group within management believed that a continuance of the corporation's traditional policies of small-store operation was most desirable. Another, because of the growth of industrial payrolls in large cities, favored emphasis on larger metropolitan units.

Examination of data collected by the Harvard Bureau of Business Research for department stores indicated various operating characteristics for large and small stores (see Exhibit 1). Among the merchandising aspects of the business (i.e., operating characteristics primarily affecting gross margin) it was noted that large department stores tended to have a greater share of their sales in home furnishings and small wares and a lower proportion in apparel, accessories, and piece goods than did small stores. Also, large stores had higher average gross sales transactions, returns and allowances, net alteration costs, and stock-turnover ratios than did small stores. Markdowns in the large stores were correspondingly lower. As a result, gross margin rates in the large stores were higher than in small department stores.

On the other hand, large stores characteristically had higher total expense rates than small stores. These higher expenses were chiefly in the following accounts: payroll, advertising, supplies, service purchased, other unclassified expenses, communication, repairs, and professional services. The large stores encountered lower expense percentages for interest, traveling, and insurance. Classified according to functional divisions, there were lower percentages in large stores for administration and general expense, executive salaries, and real estate costs. Higher costs were met in operating and housekeeping expense and in selling and delivery expense.

QUESTIONS

1. In expanding the number of stores in the chain, on what size unit should the United Stores Corporation concentrate its attention?
2. Are small retail units more efficient than large units? What factors other than size affect the costs and profits of retail stores?

Case III-6: LONG-RUN COSTS IN A CHAIN OF SHOE STORES

The following excerpts are derived from a case study of a retail shoe chain by Joel Dean and R. Warren James.*

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* *The Long-Run Behavior of Costs in a Chain of Shoe Stores: A Statistical Analysis* (University of Chicago Studies in Business Administration, Vol. XII, No. 3). (Chicago: University of Chicago Press, 1942).

STATISTICAL ANALYSIS

The objective of this statistical analysis of a group of retail shoe stores is to determine the influence of the size of a store on its cost of operation. Before the statistical results are presented, however, it is first necessary to consider the nature of the information available and the problems involved in measuring size and cost. Section A of this chapter is consequently devoted to a description of the sample, while Sections B and C are concerned with the measurement of size and cost, respectively. Section D deals with the actual results of the statistical analysis.

A. NATURE OF THE SAMPLE

From the several hundred stores operated by the parent shoe corporation a sample of fifty-five stores was selected for the purposes of this analysis. Annual data on the retail operations of each store were made available for the two years 1937 and 1938.[1] The sample of stores was selected in such a way as to provide a fairly uniform coverage of various operating conditions. An attempt was made, therefore, to choose a group of stores selling different proportions of the various types of shoes which were, at the same time, representative of the sales volume of the stores in the chain as a whole.

In order to secure as high a degree of comparability as possible the sample was further restricted on the basis of the following considerations. First, only those stores situated in the metropolitan area of a large city were included. It was thus possible to minimize regional variations in wages, rentals, and public utility rates. Moreover, since this area is under the control of one supervisor, differences in managerial efficiency attributable to supervisory skill were eliminated. Second, although the parent shoe corporation operates several shoe chains, each of a different price class, stores from only one of these chains were included in this sample, in order to obtain the homogeneity of sales service associated with uniformity of selling price. Third, the sample was restricted to those stores selling men's and boys' and girls' shoes only; stores selling women's shoes being excluded. Fourth, stores recently opened were excluded from the sample, on the grounds that they might exhibit marked peculiarities because of immaturity. "Immaturity" in this case signifies not only that systematic underutilization may exist but also that sufficient time has not elapsed to allow the store to adapt its merchandise to the special characteristics of its market. Fifth, some attempt was made to select the sample on the basis of a uniform time distribution of sales, but it cannot be claimed that this was rewarded with any success.

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As far as the factor market which confronts the firm is concerned, it appears that the demand of the individual stores is such a small proportion of the total that the prices of input factors are independent of the action of the individual store. Even though there is centralized purchasing by the shoe corporation of some supplies and some centralized hiring, which may affect factor prices, the influence of any one store can be neglected.

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[1] These two years were selected both because of their recency and because they occur in markedly different phases of the business cycle.

B. THE MEASUREMENT OF SIZE

The concept of the size of the individual firm is not a simple one. Size, however measured, cannot be dissociated from capacity in some sense. It is necessary to make a primary distinction between "technical" and "economic" capacity. Technical capacity refers to a maximum rate of operations, an upper limit set by the technical character of the plant and equipment. Economic capacity, on the other hand, refers to some rate of operations which is optimum from the point of view of cost, i.e., the rate at which average cost is a minimum. "Normal" capacity, in addition, may refer to some average or modal rate of operations which is not associated with either technical or economic capacity.[2]

Of the many size-concepts possible, it is necessary to select one which is practically measurable, relevant to cost, and which, at the same time, permits comparisons of the sizes of different firms. There are available several concepts of size which can be measured and which are not without significance for cost. The choice can be narrowed to the following three types of measure: (1) physical size of plant and equipment, (2) input capacity, and (3) output capacity.

1. THE AMOUNT OF FIXED EQUIPMENT

Size may refer to the aggregate of productive resources that are not alterable in the "short run." The amount of fixed equipment, however, is difficult to measure in terms that permit interfirm comparison, unless the equipment is highly standardized and in homogeneous units. If equipment is standardized, significant aspects of size for comparative purposes could be obtained—for example, by counting the number of spindles in a cotton mill, the number of beds in a hospital, the number of knitting machines in a hosiery mill, or some such similar unit.[3] In the case of shoe stores, one can obtain physical measures of plant size from the number of seats in a store, the area of floor space, or the number of standard lighting units (if electrical fixtures are sufficiently standardized). All these measures are subject to such a high degree of accidental variation, however, that none of them gives a trustworthy measure of size which permits interstore comparability.

2. INPUT CAPACITY

It may be possible in some instances to devise a measure of size based on input capacity. A commonly used index of size is the number of employees in an enterprise (in census classifications, for example). Raw-material inputs may also serve this purpose—for example, the crude-oil input of a refinery, the size of the charge of a blast furnace, or the number of tons of ore per day a crushing machine can handle. It may, however, often be extremely difficult to select from the complex of inputs that aspect which is most relevant. Especially when human services are involved, the concept of input capacity lacks the precision which is desirable when measurement is required. In the case of retailing, where the dominant input is labor service, measurement presents especial difficulties, so that input measures were rejected as a possible index of size.

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[2] E.g., in Chamberlin's treatment of the individual firm under monopolistic competition, output is established at some level less than the "economic" capacity.

[3] The use of value measures, while it has the advantage of comparing heterogeneous physical units, raises complex problems of valuations which need not be considered here.

3. OUTPUT CAPACITY

Another alternative is to look on the size of a firm as defined by its output. Here again, however, some important difficulties are encountered. First, when output consists of variegated products, a complex measurement problem is introduced.[4] It may, therefore, be necessary to employ index numbers to deal with cases of multiple products. Second, it is necessary in this case, as well as in the case of input capacity, to distinguish whether output represents the maximum possible rate of production, the optimum rate (for a given body of fixed plant), or some modal rate. In one of these cases the measure of size by output is clearly superior to any other. This occurs under the circumstances in which each output is produced at the minimum total cost for that output. Here there is a one-to-one correspondence between output and size, although it is true that this case may represent idealized behavior. Despite the fact that firms rarely operate under these minimum-cost conditions, the use of actual output as representative of size is the most satisfactory measurement device obtainable.

The next question to be considered is the information which is available concerning the output of the shoe stores. The total sales of each retail outlet in the sample are composed of the following types of merchandise: (*a*) men's shoes, (*b*) boys' shoes, (*c*) girls' shoes, (*d*) hosiery (men's, boys', and girls'), (*e*) rubbers, (*f*) sundries. These categories are self-explanatory except for sundries, which include bedroom slippers, shoe laces, shoe polish, and other small accessories. The dollar volume of sales of each category was available for 1937 and 1938, and information concerning the physical volume of sales of men's and children's shoes was also provided.[5] The assortment of shoe styles stocked differed somewhat from store to store, but information concerning the composition of shoe sales with respect to the various types and styles was not available.[6]

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[4] The superiority of an input measure arises when the degree of input homogeneity is greater than the degree of output homogeneity, e.g., in oil-refining it is simpler to use the input of crude oil rather than the complex of end-products.

[5] The lack of data concerning the physical volume of sales of hosiery, rubbers, and sundries constituted an important gap in the data, which prevented examination of the effect on cost behavior of varying the proportion of total *physical* sales composed of these miscellaneous items.

With this information at hand, the next step was to derive from it some satisfactory index of output. Retail selling output is best considered as the production of sales service. Sales service is the contribution of the shoe salesman to the prospective purchaser in the form of help, advice, and expert knowledge. Without too much violence to the facts, this sales service can be treated as a homogeneous product. Although the quantity and quality of sales service per transaction may differ somewhat from type to type, from style to style, from store to store, and from time to time in the same store, the variability of sales service is nevertheless limited. There are several influences making for uniformity of service standards. For example, all the stores in the sample are in one city, under the same supervisor, and have standardized recruiting and training policies. Moreover, the employment of extra salesmen drawn from a trained reserve force tends to prevent serious impairment of service standards during rush periods. Since marked deterioration of service would result in loss of customer good-will and patronage, it may be presumed that, with good management, efforts will be made to confine variation in service quality within narrow limits. The assumption is probably correct that the intangible output of sales service is highly correlated with some aspect of retail transactions which is capable of measurement. The immediate problem is to select some one composite measure of the volume of shoe sales in either physical or value terms which will most reliably reflect output in terms of sales service.

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Despite its omission of sundry sales, it was decided to employ number of pairs of shoes sold, including both men's and children's shoes, as the best available index of output. This choice was made on grounds of convenience and because a more satisfactory measure was lacking.

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C. THE MEASUREMENT OF COST

The primary cost data made available by the shoe corporation show the details of the annual expenditure of each store in the sample. The total operating cost is broken down into twenty-three accounts, for each of which the annual total is known for the two years 1937 and 1938.

Two of the elements of cost listed deserve special mention, however. These are general indirect expense, which is an allocation to each store of its share of the expenses of the chain as a whole which cannot be accurately charged to one account, and administrative expense, which is the share of the corporation's central administrative expenses charged to each store. In view of the arbitrary method of allocation, it was considered that the inclusion of these two elements might obscure the relations which it is desired to investigate. Consequently, in the calculation of operating cost these two elements were omitted.

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[6] Since the styles and sizes stocked were adapted to the peculiarities of the individual store's clientele within the limits of the standard styles carried by the chain, it appeared unlikely that important heterogeneity in the sales-service unit resulted from the relatively minor store-to-store variation in assortment of styles

In order to obtain an insight into the behavior of broader categories of cost, the elements of cost were classified into the following groups:

1. Selling expense
   - *a*) salaries
   - *b*) reserve salaries
   - *c*) employees' discount
   - *d*) hosiery award
   - *e*) shoe bonus
   - *f*) advertising
   - *g*) taxes
2. Handling expense
   - *h*) delivery (including inbound, outbound, and interstore)
   - *i*) insurance
   - *j*) postage
   - *k*) supplies
   - *l*) miscellaneous
3. Building expense
   - *m*) rent
   - *n*) light
   - *o*) heat
   - *p*) window display[7]
   - *q*) repairs
   - *r*) depreciation
   - *s*) water, ice

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D. Statistical Findings

As pointed out already a separate analysis of the relation of cost to output in the fifty-five shoe stores was undertaken for each of the years 1937 and 1938. This was advisable not only because of the lack of precise comparability in the data for the two years but also because of the additional confirmation that would be afforded by agreement in the two sets of results. Preliminary examination of the relation between cost and output indicated that the pattern of cost behavior was essentially the same in both years.

This preliminary analysis of the data by means of scatter diagrams showed the observations to be distributed in a fashion which indicated logarithmic dispersion. This was substantiated by the appearance of the scatter diagrams when plotted on double logarithmic paper. Consequently, except in the analysis of average cost behavior, the logarithms of the cost and output variables were employed in the calculations throughout the investigation.

Correlation analysis was used as the basic statistical technique, either linear or curvilinear functions being fitted to the data by the method of least squares. The fitting procedure was carried through, first, for total cost, which is the aggregate of reported expenditures of the store, excluding allocated administrative expense and general indirect expense.

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[7] The inclusion of window display under building expense rather than under selling expense may be questioned. It is classed as it is mainly because of its similarity to interior displays. On the other hand, almost the whole of a store is devoted to displaying and advertising, so that if the window display were classified as advertising so should much of the other building expense. Its inclusion in one or the other is, however, not an important matter.

Second, the behavior of average cost, derived directly from the data, was examined by means of correlation analysis.

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1. TOTAL COST

The relation of total cost to physical volume of shoe sales for 1937 and for 1938 is shown in the scatter diagrams in the upper and lower panels of Exhibit 1. A detailed examination of the position of the individual stores indicated that the relation between cost and output remains fairly stable during these two years. The principal virtue of logarithmic analysis is that changes in the magnitude of the logarithms of the variables in which interest lies represent relative changes in the variables. Consequently, the slope of a function which is in logarithmic terms gives the elasticity of the function of the variables themselves. From a knowledge of the behavior of the elasticities it is immediately possible to deduce the shape of the cost-output functions. The parabolic shape of the fitted regression lines shows that the relative change in cost is increasing, compared to the relative change in output. In other words, since the slope of the regression line is always becoming steeper, the elasticity of total cost is increasing over the whole range of output. On the basis of this knowledge of the behavior of total-cost elasticity, it is easily possible to translate the relations portrayed on the double logarithmic scatter diagram into arithmetic terms.

For example, in order to analyze the behavior of average cost, it is necessary only to make use of the proposition that average-cost elasticity is equal to total-cost elasticity *minus* 1. It is, therefore, apparent that unitary elasticity of total cost corresponds to zero elasticity of average cost. If total-cost elasticity moves from values less than unity to values greater than unity, it is seen that the corresponding elasticity of average cost is at first negative, then zero, and finally positive. This means that the average-cost curve displays the familiar U-shape with a minimum point where average-cost elasticity is zero. An inspection of Exhibit 1 indicates that for both 1937 and 1938 the minimum point of the average-cost curve is reached at an output of approximately 33,000 pairs, since it is at this level of output that total-cost elasticity (the slope of the regression curve) is unity.

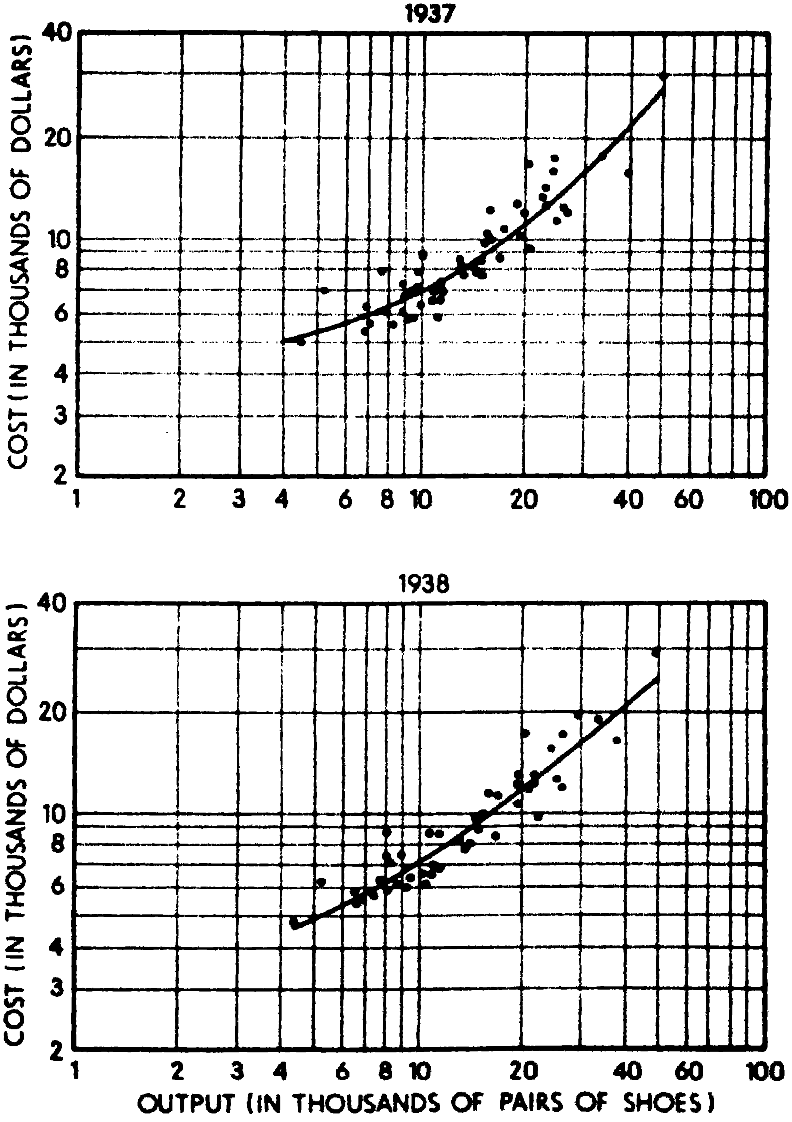
It is unfortunate that only three stores in the sample have outputs in excess of this critical level of operations, for one can, therefore, have little confidence in the precise magnitude of the optimum rate of operations. This does not mean, however, that the significant change in the elasticity of total cost is attributable only to the influence of the large stores. Even if they are excluded from the analysis, an upward bend occurs in the regression line—in fact, it becomes more marked, and the parabolic shape of the average-cost curve is even more clearly defined.

There are, indeed, some grounds for the exclusion of the three largest stores from the sample. Those stores which sell more than 30,000 pairs of shoes annually may have special characteristics which set them apart

Exhibit 1

SHOE-STORE CHAIN

SIMPLE REGRESSIONS OF TOTAL COST ON OUTPUT MEASURED BY SHOE SALES IN PAIRS



from the smaller stores in the sample. The three large stores are located in the downtown area and therefore are faced with selling conditions which are different from those stores in the outlying regions. While downtown stores have generally marked daily peak loads at noon and in the late afternoon, peripheral stores are more likely to be subject to heavy peak loads on different days of the week, e.g., Saturdays. This influence, which depends on location, may be sufficient to explain the atypical behavior of these stores. If one could be sure that these stores are not homogeneous, they could be omitted from the analysis altogether. If this were done, there would be stronger confirmation of the existence of an optimum-size shoe store for outlying metropolitan markets. However, since, even without the retention of these large stores, the existence of an optimum size is clearly shown, it was decided to retain the large stores in the statistical analysis.

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2. AVERAGE COST

Apart from the information concerning average cost derived from the regression functions fitted to the logarithms of the cost and output data, supplementary confirmation was obtained directly by the analysis of average-cost behavior. Scatter diagrams were made of average cost per hundred pairs of shoes sold for the two years, the pictorial representation of this being shown in Exhibit 2. Regression functions were also fitted to the average-cost data. The scatter of the extreme observations is so wide that the behavior of average cost is not well defined in that region where the optimum output was found to be by other methods. Consequently, the upward trend of average cost is not apparent when the three large stores are excluded.

THEORETICAL ANALYSIS

In this theoretical part of the study Section A will be devoted to a number of problems associated with the use of output as an index of size and to the difficulties of obtaining an adequate measure of retail output Section B will consider the statistical results in the light of the theory of long-run cost of the individual firm.

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A. The Nature and Measurement of Retail Output

A primary difficulty is encountered in attempting to define precisely the character of the output of a retail enterprise. The traditional theory of the individual firm considers the output produced by the firm to be units of physical commodities—gallons, bushels, or tons, etc.

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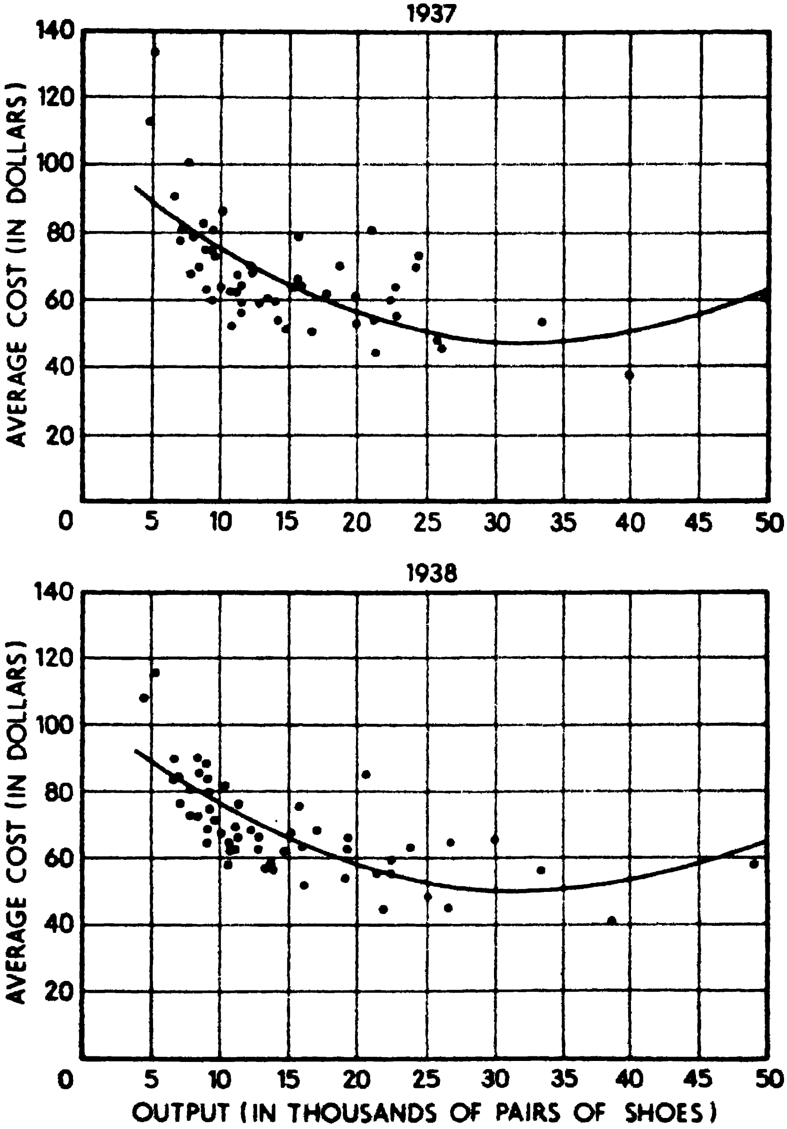
Physically, retail commodities as a rule undergo no change in being placed in the hands of the consumer. Therefore, the treatment of production as a physical process of transformation is not appropriate to retail

Exhibit 2

SHOE-STORE CHAIN

Simple Regression of Average Cost on Output Measured by Shoe Sales in Pairs



selling. Nevertheless, the retail store makes an essential contribution to the completion of this transformation.

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The assumption upon which this study is based is that the output of a retail enterprise consists of the services which it renders to purchasers. These services place the physical commodities conveniently at the disposal of the consumer, widen his range of choice, and add to his knowledge of quality, grades, and prices.

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It is necessary now to consider the assumptions underlying the measurement of size by rate of output and to investigate the bearing of the special features of the type of retail enterprise under discussion on this identification. The simplest case is the representation of size by "normal" or planned output, where the technical equipment of the enterprise is adjusted ideally to the originally planned output. The rate of output is assumed to be uniform and synchronized to a repetitive demand situation for each future period or "week." Moreover, equipment is assumed to be at all times utilized at its planned capacity. This is, however, an idealized case, and some account must be taken of the fact that all firms subject to daily, seasonal, and cyclical fluctuations in demand and using, none the less, equipment which outlasts successive waves of high and low demand, face a recurrent problem of unused capacity. It is not a question of errors of planning in many cases, rather it is foreseen by the entrepreneur that the existing demand situation gives rise to marked peaks and troughs. It will be essential for the entrepreneur to secure some degree of flexibility in operations.

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When the extreme variability of output which characterizes retail selling is introduced, there is no longer any clear-cut relation between output and size. Plants will be constructed so that peak loads can be handled in some manner, but it may well be true that under such circumstances the minimum-cost combination cannot be achieved for any output. Rather, the fixed plant may be designed to achieve sufficient flexibility so that it is possible to produce for demand in both the peaks and the troughs. As a result of such an uneven time distribution of demand, therefore, the precise correspondence of output and size which is relevant in the case of uniform and repetitive demand does not exist.

B. The Theory of Long-Run Cost of the Individual Firm

For changes in output volume that promise to endure for a long period the typical behavior of the entrepreneur is to adapt his firm completely by changing the size of his fixed plant and equipment, as well as the rate of input of more easily variable factors, with a view to obtaining the minimum-cost combination of inputs for the new level of output. This type of adjustment will be denoted by "total adaptation."

Attention must now be directed to the behavior of the total cost-output function under the assumption that all productive resources are substitutional and freely variable from zero to indefinitely large amounts. This is the traditional case of the "long run," which is considered to mean a state of affairs in which free variation of all ordinarily fixed productive resources is possible.

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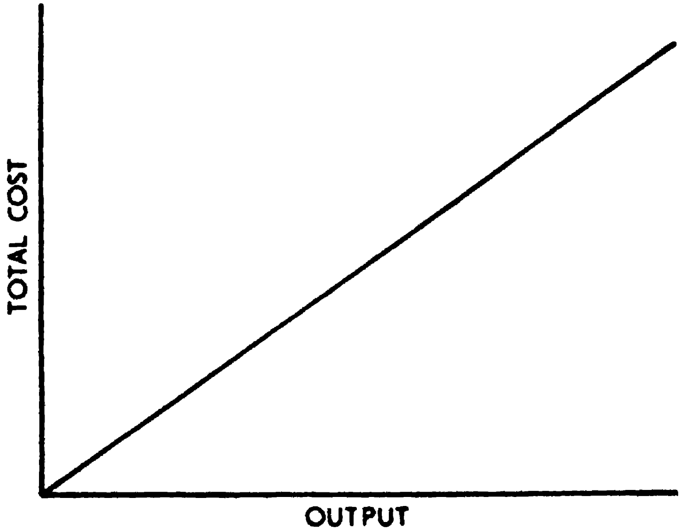
Under the assumptions stated, there is no reason for the optimum proportion of factors, established for one output, to be different for any other level of operations. Under these circumstances, for total adaptation, the enterprise exhibits constant returns to scale, and total cost is, therefore, a linear function of output. The total-cost curve is, therefore, a straight line, passing through the origin of the co-ordinate system whose axes are cost and output. This is illustrated in Exhibit 3.

Exhibit 3

TOTAL-COST CURVE FOR TOTAL ADAPTATION WITH UNCHANGING PRODUCTION FUNCTION AND COMPLETE DIVISIBILITY



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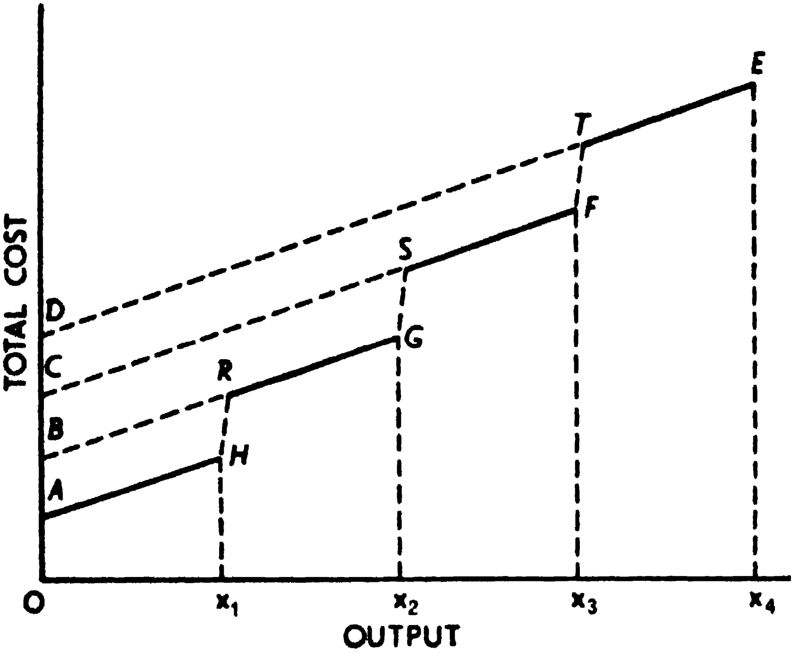
In developing a model to describe the behavior of the costs of a retail shoe store when it is in a position to adapt all its facilities (including salesmen) to changes in output, it is necessary to take into account the indivisibility of the agents of production. It is evident that, actually, the capacity of a salesman is subject to wide variation. Nevertheless, it is convenient to make the assumption that each salesman possesses a specific sales capacity—an assumption which does not affect the sub-

Exhibit 4

TOTAL-COST CURVE FOR TOTAL ADAPTATION WITH UNCHANGING PRODUCTION FUNCTION AND INDIVISIBILITY OF FACTORS



stance of the argument. As a consequence, as the capacity of the existing salesmen in a store is fully utilized, it becomes necessary to employ an additional man. These circumstances introduce a significant modification into the cost function which was previously derived. The change, which consists of the introduction of discontinuities, can be shown diagrammatically in Exhibit 4. The ordinate represents total cost, and the abscissa output. The total curve cuts the cost axis positively at a height representing the minimum costs which must be incurred before any operations are possible. Ox_1 represents the capacity of the first salesman, x_1x_2 the capacity of the second, and so on. When operations exceed the level Ox_1, therefore, an additional salesman must be employed, whose selling capacity is underutilized until the output Ox_2 is reached, at which point no idle capacity exists. The length of the line *RH* represents the salary (excluding commissions) of the new salesman. But now under these new conditions, as long as the second salesman is retained, the cost curve becomes *BRG*. Similarly, *DTE* becomes the cost curve for the enterprise operating in the range x_3x_4, again provided that the adjustment is not reversible. When there is complete reversibility, of course, the cost curve for total adaptation becomes the broken line *AHRGSFTE*.

There is good reason to believe that this discontinuous behavior of cost is representative of the retail selling of shoes. The dotted sections of the cost curves in Exhibit 4 become of particular significance for this investigation. For example, suppose a store operates during its rush hours at or near its maximum capacity with the retention of the same quality of service. Then during slack hours in the morning or at other times the store will move along the cost curve on to the dotted section. This is a result of the fact that the store can anticipate the future occurrence of rush periods and will therefore retain the unused selling force during the intervening periods.

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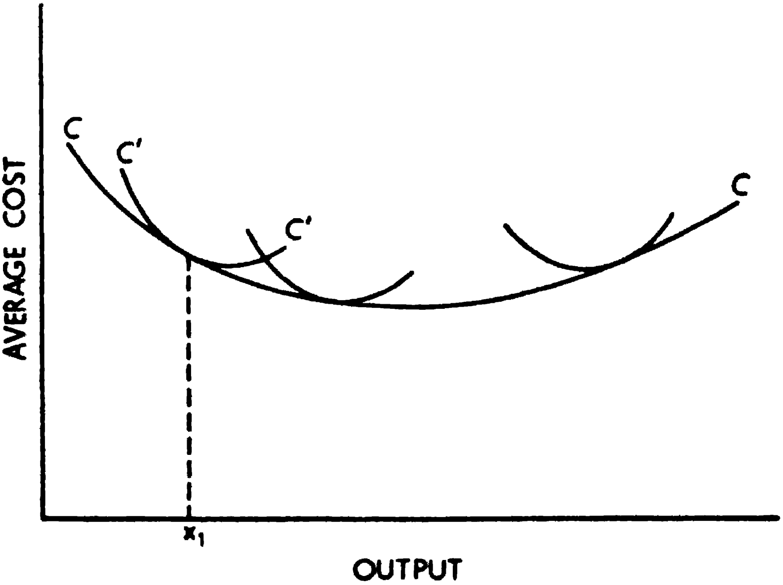
C. ECONOMIC INTERPRETATION OF STATISTICAL FINDINGS

In contrast to the two theoretical models of cost behavior discussed in the previous section, the empirical cost function possesses a branch which rises more than proportionally to output when high levels of output are reached. The purpose of this discussion is to try to explain this shape of the empirical cost function.[*]

Exhibit 5

LONG-RUN AVERAGE-COST CURVE WITH COMPLETE DIVISIBILITY



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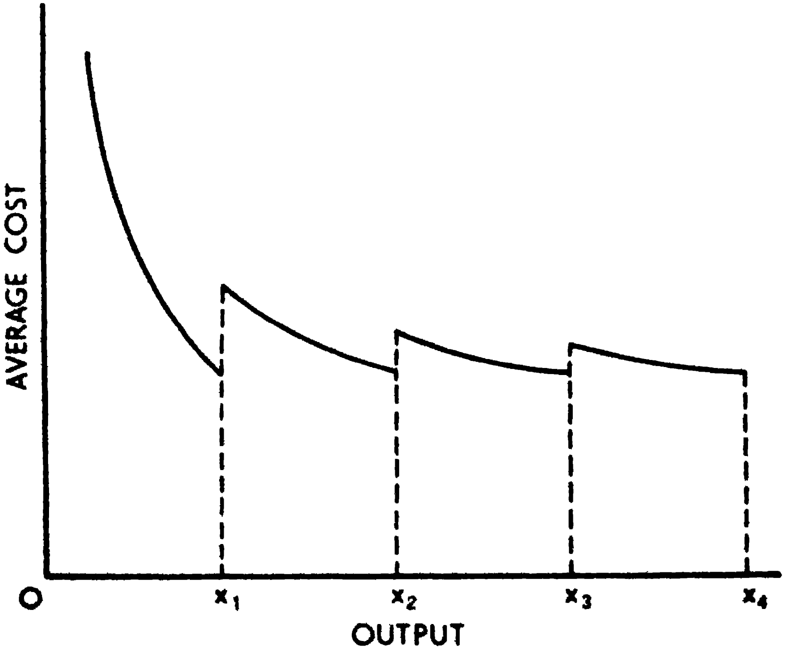
[*] It should be recalled that the statistically determined cost functions are in logarithmic terms. There is, however, no essential difference in the behavior of these cost functions if they are transformed into arithmetic terms. Consequently, in the following discussion no account is taken of this small problem.

Customarily, in the English literature of the theory of cost, the treatment of long-run cost behavior is given in terms of the long-run average-cost curve, the so-called envelope or interplant curve. This curve is shown usually to be parabolic or U-shaped. In other words, it first declines, then rises after a certain level of output is reached. Exhibit 5 portrays the long-run average-cost curve as the envelope of a series of short-run average-cost curves. Points on CC, the envelope curve, show the level of average cost for the corresponding output when the complex of factors of production are harmoniously adjusted, i.e., the plant and equipment are ideally adapted to produce the given output. The short-run curve C′C′, which is tangent to the envelope curve at Ox_1, depicts the course of average cost, as the output for which the plant and equipment is suited is departed from. Attention is here restricted to the long-run curve. It was emphasized earlier, however, that the nature of shoe retailing is such that a harmonious adjustment of factors for any output is inconceivable because of demand irregularities. In consequence, the average-cost curve which is relevant in the case under consideration is one derived from the discontinuous total-cost curve depicted in Exhibit 4. This average curve is illustrated in Exhibit 6. In this case average cost at the

Exhibit 6

AVERAGE-COST CURVE FOR TOTAL ADAPTATION WITH UNCHANGING PRODUCTION FUNCTION AND INDIVISIBILITY



outputs x_1, x_2, x_3, and x_4 corresponds to points on the continuous envelope curve in the traditional case. In actuality, the statistical observations which are available are not estimates of average cost for harmonious combinations, and there is no reason to believe that the empirical cost function indicates the shape of the envelope curve. It seems advisable, therefore, to drop the envelope curve as a theoretical foundation intended to elucidate the statistical results.

Nevertheless, in the discussions of the shape of the envelope curve in economic literature, there are certain considerations which may be relevant to the problem at hand. In particular, the explanation of the parabolic shape of the curve is of especial interest here. This behavior of average cost is sometimes attributed to internal economies and diseconomies of scale, which arise because of the existence of some indivisible fixed factors. In the long-run case by definition, fixity is possible only for some aspect of the entrepreneurial function. This is Kaldor's interpretation, which is a widely accepted one, illustrated in his comment:

> ". . . The costs of the individual firm must be rising owing to the diminishing returns to the other factors when applied to the same unit of entrepreneurial ability. The fact that a firm is a productive combination under a single unit of control explains, therefore, by itself why it cannot expand beyond a certain limit without encountering increasing costs."[8]

Such an explanation, however, is of little value in the case of the retail shoe stores. The entrepreneurial functions performed by shoe-store managers are almost nil, in view of the positions of the stores under the control of a central office. The managerial and supervisory activities of the branch manager can be delegated to assistants. In the case of independent owners, however, there is a certain essential entrepreneurial function which by its very nature cannot be shifted. Kaldor's reason may be valid in the case of individual independent stores, but in the circumstances encountered it must be rejected as inapplicable.

The envelope curve is also explained in terms of increasing and then diminishing effectiveness of managerial control as the firm's size increases. Again, in the case of retail shoe stores, the organization of large stores is not much more complex than that of small stores. It is true that there may be some growth of specialization (e.g., the employment of porters and cashiers), but the extent to which this is possible in a shoe store is limited. Furthermore, the limited specialization which does take place is a matter of display and convenience. The increasing complexity in organization encountered in large-sized stores is intended to maintain the quality of the sales service, but this does not imply higher operating costs.

There is one characteristic of retail selling, however, which would provide a rationale for rising average cost for extremely high output. Such a circumstance would arise where selling costs are necessary to maintain the market of the individual store. With the growth of the store and the spreading-out of its market, progressively increasing promotional expenditure is necessary to draw in peripheral buyers. In the case of the stores of the shoe chain, however, there is no evidence that this explanation is relevant. The advertising of the individual stores is very small, almost the whole of such expense being incurred on behalf of the chain as a whole, the cost being prorated over the members of the chain.

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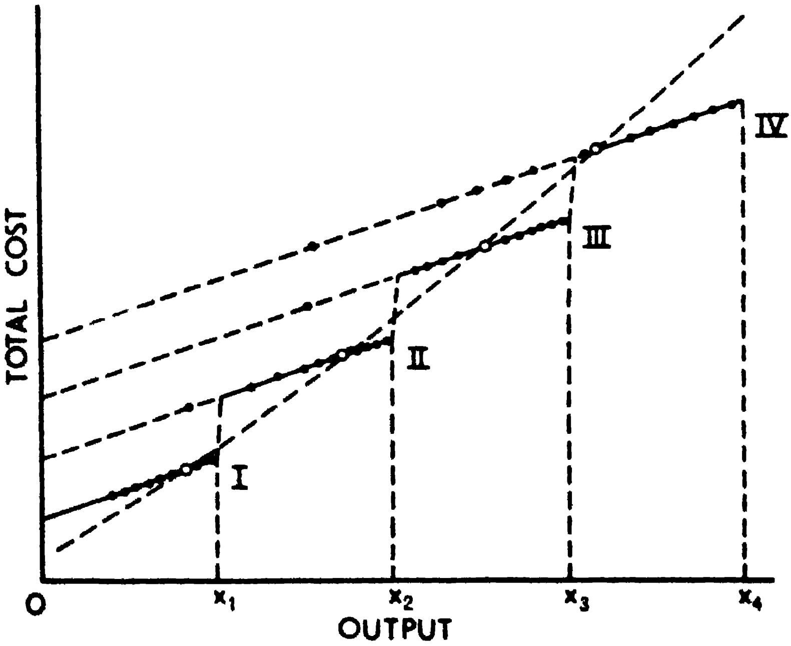
[8] N. Kaldor, "The Equilibrium of the Firm," *Economic Journal*, March, 1934, p. 67.

These explanations for the observed behavior of costs must be rejected as inapplicable, therefore, and it is necessary to examine more carefully the nature of the statistical observations in the light of the theoretical model for retail selling to see if any more tenable reason for the shape of the empirical cost function can be found.

Let us consider the nature of the observations of a group of four stores of different sizes ranging from very small to very large. The behavior of the costs of such stores was illustrated previously in Exhibit 4, where there were assumed to be discontinuities in total cost with increases in output but not for decreases in output below each critical level. The total-cost curve for a store becomes *DTE* when its output grows beyond the level Ox_8. Similarly, a store whose output moves beyond Ox_7 possesses

Exhibit 7

HYPOTHETICAL DISTRIBUTION OF TOTAL-COST OBSERVATION FOR DIFFERENT-SIZED STORES



the cost curve *CSF*. The same process of change is illustrated when a store's output exceeds Ox_1 and its new cost curve becomes *BRG*. It is possible to look on these curves as pertaining to different stores, which for convenience will be numbered I, II, III, and IV. This is illustrated in Exhibit 7, and in addition a sample of hypothetical daily rates of operation is marked in on the curves. These dots represent daily sales expressed in terms of a rate per annum. The actual statistical observation of cost for any store is the average of all these daily observations. For each store the hypothetical annual observation is marked with a circle. The annual observation tends to lie comparatively closer to the dotted section of the cost curve for large than for small stores. This is because for large stores the observations can range between daily rates of operation of, say, 0–50,000, while for small stores the range is only 0–5,000. Compare, for example, the annual average of Store II and Store IV. This means that the problem of unevenness of the distribution of sales over time may lead to a comparatively more serious underutilization of capacity in large than in small stores. It is apparent from the diagram that a curve fitted to the annual averages shown by the circles will yield a cost function which accords very closely with the empirically determined functions portrayed in Exhibit 1.

QUESTIONS

1. "An inspection of Exhibit 1 indicates that for both 1937 and 1938 the minimum point of the average-cost curve is reached at an output of approximately 33,000 pairs." Does this mean that the most efficient-sized shoe store is one handling 33,000 pairs per annum? What qualifications should be made in this proposition?
2. What difficulties are encountered in measuring the economic size of a retail shoe store?
3. Does the empirical cost curve shown in Exhibits 1 and 2 correspond to the long-run cost curve of economic theory? In what ways does it differ?
4. The U-shape of the average cost curve is usually attributed to the internal economies and diseconomies of scale (i.e., size of the business unit). To what extent does this explanation apply to the average cost curve shown in Exhibit 2?

Effects of Changes in Technology on Cost

Case III–7: EAST-WEST AIR LINES, INC.[1]

In 1947 East-West Air Lines, Inc., was operating a main-line fleet of twenty-two prewar, twin-engine air liners. With the reduction in air traffic following the war, the company was losing money each month. Mr. Henry L. Avion, president of East-West Air Lines, had

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[1] Fictitious name.

had conferences with representatives of the Glenn L. Martin Company, airplane manufacturers, who suggested to him the desirability of replacing the company's main-line fleet of prewar planes with Martin 2-0-2's. The Martin Company claimed that replacement of the old equipment would put East-West again in a profit position.

East-West Air Lines was a domestic carrier, operating passenger planes from Washington and Baltimore to Miami and westward to New Orleans and Houston. Its three main routes described a triangle, with the northwestern side of the triangle bounded by alternate routes from Houston and New Orleans to Nashville and thence, as one route, to Washington and Baltimore. Feeder lines were maintained to deliver traffic to points on the main lines.

The capital structure of the air-lines company was considered strong. Adequate financial backing made it possible to add to its capital equipment, either through borrowing or through issuance of additional securities, if that seemed desirable.

The twin-engined air liners averaged 400 miles per trip. Because of the inflexibility of schedules, no change in average trip mileage would be expected even if equipment were replaced. There was also no change anticipated in average numbers of hours of utilization per plane per year; this remained at 3,650. The Martin 2-0-2's, however, were capable of maintaining a cruising speed of 253 miles per hour as against an average speed of 191 miles per hour for the prewar planes. Block speed of the Martins was also higher; 219 miles per hour as against 168 for the prewar planes. The Martin air liners seated thirty-six passengers, while the existing planes seated only twenty-four. As a result of the greater speed and greater seating capacity, therefore, twelve Martin 2-0-2's in the course of a year could produce more passenger seat-miles than could the larger fleet of twenty-two prewar planes. The estimated capacities of the two types of planes were as follows:

	12 Martin 2-0-2's	*22 Prewar Planes*
Available seat miles/yr.	315,000,000	335,000,000
Seat miles at 60 per cent load factor	207,000,000	201,000,000

Despite the reduction in number of planes contemplated with the new equipment, improved speed and turnabout time indicated that the same number of flights could be maintained as formerly.

The original cost of East-West Air Lines' prewar air liners was approximately $115,000 per plane, although some were purchased for as much as $125,000. On the accounts of the company these capital values had been reduced to an average, after depreciation, of $50,000. The new Martin 2-0-2's were available at a capital expenditure of $380,000 per plane. This figure included engines, radio equipment, and other equipment. It was regarded as sound accounting practice to depreciate new airplanes such as the Martin 2-0-2 over a five-year period with a 10 per cent residual. Most air lines with prewar equipment planned to write it off over one or two years because of obsolescence. In the opinion of the East-West Air Lines maintenance department, however, the prewar equipment could be kept up to C.A.B. standards for about five years without excessive maintenance charges.

Exhibit 1

OPERATING EXPENSES, EAST-WEST AIR LINES, INC.

	Expense per Airplane Hour	
	Martin 2-0-2	Prewar Plane
Direct:		
Fuel cost	$ 28.20	$ 14.11
Oil cost	1.56	0.91
Airplane depreciation	13.24	4.93
Engine depreciation	6.25	2.00
Engine overhaul and repair	8.59	4.05
Airplane overhaul and repair	9.50	4.36
Airplane and engine ground service	7.51	6.87
First pilot cost	10.90	10.19
Co-pilot cost	5.45	4.77
Cabin attendant cost	2.23	1.97
Crew expenses		
Cockpit	0.97	0.76
Cabin	0.70	0.58
Airplane insurance cost	7.78	2.58
Total direct expense	$102.91	$ 58.08
Indirect*	128.64	72.60
Total operating expense	$231.55	$130.68

* Includes ground operations, ground and indirect maintenance, passenger service, traffic and sales, advertising and publicity, general administration, depreciation on ground equipment. These expenses were regarded as fixed within the usual limits of plane operation. In minor degree, however, some of these expenses fluctuated with numbers of passengers handled but not with airplane miles flown. Indirect expenses were calculated at 125 per cent of direct expenses.

To demonstrate the desirability of replacing East-West's prewar equipment with Martin 2-0-2's, representatives of the Glenn L. Martin Company prepared two operating-cost schedules for the present fleet of twenty-two twin-engined planes and for the reduced fleet of twelve new air liners which could replace it. These costs are shown in Exhibit 1. On the basis of these figures Martin representatives claimed that the total cost of flying 345,000,000 seat miles would be almost $500,000 less than the cost which East-West incurred in 1946, when it flew 335,000,000 seat-miles.

The average annual-load factor experienced by air lines in the United States after the war was 65 per cent. Martin Company representatives, in making revenue estimates on which to base their arguments, used a conservative load factor of 60 per cent. In many operating periods East-West had been well above the national average and on some sections of line had approached 80 per cent load factors for short periods.

QUESTIONS

1. Should the East-West Air Lines replace its main-line fleet of twenty-two prewar planes with twelve Martin 2-0-2's?
2. If conditions of demand indicated a probable decline of substantial proportions in the volume of passenger traffic, would your answer be the same?
3. How would changes in demand for the products of the airplane manufacturing industry differ, over a period of years, from changes in demand for air transportation?
4. What effect have cost calculations made by the air transport industry on demand calculations made by the airplane manufacturing industry?

Case III–8: PENNSYLVANIA RAILROAD COMPANY

In the winter of 1946–47, the Pennsylvania Railroad faced the problem of possible replacement and supplementing of its fleet of locomotives. If new motive power were to be acquired, the choice lay between improved types of steam locomotives, on the one hand, and Diesel-electric locomotives, on the other.

The new locomotives would serve on that part of the Pennsylvania's main line which extended from Harrisburg to St. Louis on the southwest and to Chicago on the northwest. From Harrisburg west to Altoona the line rose steadily in elevation. Between Altoona and Pittsburgh, it encountered the Allegheny Mountains with grades up to 1.75 per cent. West of Pittsburgh the terrain became undulating to Columbus and Crestline, beyond which the road bed was practically level.

The application of the Diesel principle to railroad motive power had its practical inception at the beginning of the 1930's. It was not immediately apparent, from the early record of Diesel power, that these units were destined to become reliable instruments for the movement of freight and passenger trains. In the late 1920s the Pennsylvania Railroad began the major task of completing its electrification between New York and Washington. Electric energy from a central power source had long demonstrated its utility as a form of railroad motive power. The eastern seaboard, with its great, closely spaced passenger terminals and its tunnels, seemed to be better adapted to electric power than to Diesel, with its noise and fumes. Furthermore, the frequent use of trains of eighteen cars and more in length required tremendous concentrations of power for rapid acceleration in pulling out of the numerous terminals. Electric engines energized through catenary systems were particularly well adapted to this purpose.

Thus, while some other roads were looking more closely into the Diesel field, the Pennsylvania Railroad electrified its main lines along the Atlantic seaboard. The substitution of electric for steam power in this area eliminated use of coal for fuel at its most expensive point, so far as the Pennsylvania was concerned. It had been necessary to pull company coal for this area over the Allegheny Mountains into the numerous large eastern terminals. Because of the great volume of high-speed passenger business between New York, Philadelphia, and Washington and because of the tonnage of perishable and other important freight moving between Potomac Yard and New York, the steam power then utilized in that territory was of the highest quality and efficiency. Electrification thus released a fleet of excellent steam engines, for use in the other regions of the Pennsylvania Railroad. This made possible the retirement of hundreds of older and less efficient steam engines, thereby lowering the average age and raising the efficiency of the steam power generally. If any substantial Dieselization had been undertaken in the late 1930's, it would have been in substitution for highly efficient forms of steam power.

Nevertheless, the Pennsylvania looked closely into the possibilities of diesel power. At that time (1939) new steam engines could have been acquired for half of what was to be their postwar prices, while the cost of Diesels held at about $110 per horsepower before and after the war. Thus, on an investment cost basis, the Diesel was, by 1946, much more attractive than before the war.

One of the principal considerations affecting replacement of the existing equipment of the Pennsylvania Railroad was the remaining service life of its fleet of locomotives. The age distribution of this motive equipment was as indicated in Exhibit 1.[1] Of the 4,692 locomotives in the fleet, 282 were electric, 38 were Diesel locomotives and gasoline switching engines, and 4,372 were steam. The usual replacement period for steam locomotives was thirty years; for Diesels and electrics it was twenty-seven years.[2] In the eleven-year period from 1935 to 1946 the Pennsylvania Railroad had purchased 331 new electric locomotives. Thus, in view of the usual service life, most of the 282 electric locomotives in its service on December 31, 1946, were relatively new.

Exhibit 1

AGE DISTRIBUTION OF LOCOMOTIVES OPERATED BY PENNSYLVANIA RAILROAD, DECEMBER 31, 1946

Year Built	Number	Percentage of Total	Average Age in 1946 (Years)
1919 and prior	2,858	60.9	27 or over
1920–24	761	16.2	24
1925–29	473	10.1	19
1930–34	189	4.0	14
1935–39	122	2.6	9
1940–45	242	5.2	4
1946	47	1.0	Less than 1
Total	4,692	100.0	

Source: *Moody's Manual for Railroads 1947*

Maintenance policy also played a part in the company's decision on replacement of equipment. During the war, railroads brought out of retirement all available equipment. This fact accounted for the relatively large number of old locomotives shown in Exhibit 1. It had long been company policy, however, for the Pennsylvania to maintain its equipment in good repair in order to insure efficiency in use and satisfactory length of life. A "full maintenance" policy had the effect of reducing the rate of replacement.

Certain of the company officials believed that investment in new locomotives should be determined in large measure by the anticipated trend of rail traffic. Exhibit 2 gives freight revenues and tonnage carried by the Pennsylvania for the years 1921–46. Exhibit 3 presents passenger revenues and train-miles for these years. The management estimated that revenue freight ton-miles in the ten

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[1] One official of the Pennsylvania stated: "During the war our steam locomotives had taken a terrific beating from being almost continually in service and many were in need of extensive repairs and hundreds were facing immediate obsolescence. This was a further incentive for quick replacement by Diesel-electric power."

[2] Interstate Commerce Commission, *Statistics of Railways in the United States*.

Exhibit 2

FREIGHT TONNAGE, REVENUES, AND MOTIVE POWER, PENNSYLVANIA RAILROAD, 1921–46

	Freight Ton-Miles Revenue Freight (Thousands)	Freight Locomotives Dec. 31	Freight Ton-Mile Per Locomotive	Freight Revenue
1921	34,341,733	4,220	8,137,800	$405,210,980
1924	41,587,072	5,022	8,281,000	440,567,310
1928	44,989,625	4,353	10,342,500	457,294,397
1932	25,222,172	3,559	7,084,900	235,347,937
1936	35,706,781	3,222	11,082,100	333,350,239
1940	39,755,555	3,069	12,949,700	363,510,306
1942	67,028,327	3,086	21,692,000	608,598,902
1943	71,261,015	3,198	22,269,100	658,767,206
1944	71,262,339	3,217	22,132,000	674,395,308
1945	63,688,834	3,237	19,657,100	603,561,529
1946	56,741,355	3,187	17,787,300	551,296,168

Source: Revenues and tonnage data from Interstate Commerce Commission, *Statistics of Railways in the United States* (Washington, published annually); Motive power data from *Moody's Manual for Railroads, 1947*.

years following the war would fluctuate between fifty and sixty billion per annum, while revenue passenger train-miles in this period were expected to average between forty and forty-six million per annum. It was recognized, however, that the general adoption of improved motive power by competing railroads would have an adverse effect on the Pennsylvania's revenues unless the company also replaced some of its obsolete equipment.

Exhibit 3

PASSENGER MILEAGE, REVENUES, AND MOTIVE POWER, PENNSYLVANIA RAILROAD, 1921–46

	Revenue Passenger Train Miles (Thousands)	Passenger Locomotives (Steam, Electric)	Passenger Train Miles Per Locomotive	Passenger Revenue
1921	47,701	1,117*	42,705	$155,065,297
1924	60,430	1,330*	45,436	147,523,905
1928	60,110	1,152*	52,179	131,179,771
1932	44,353	942	47,084	59,738,930
1936	42,638	884	48,233	67,552,238
1940	41,613	807	51,565	71,623,220
1942	48,803	794	61,465	169,122,194
1943	54,105	799	67,635	245,537,445
1944	56,104	795	70,571	260,804,982
1945	57,248	807	70,940	258,864,871
1946	53,650	839	63,870	207,023,702

* Estimate based on 1936–46 division between freight passenger and switching locomotives.

Source: Revenues and tonnage data from Interstate Commerce Commission, *Statistics of Railways in the United States* (Washington, published annually); Motive-power data from *Moody's Manual for Railroads, 1947*.

A further consideration in determining the desirability of replacements was the operating cost of Diesels and of new types of steam locomotives and a comparison of these costs with those for operating present equipment. Although the Pennsylvania Railroad had had no opportunity within its own system to compare operating costs of Diesels with those for steam, an experiment with new types of steam and Diesel passenger locomotives conducted by the New York Central Railroad in the fall of 1944 and spring of 1945 threw some light on relative operating costs. These are shown in Exhibit 4. In these tests the New York Central used six 4,000-horsepower, double-end Diesels and six 4–8–4, S1 Niagara steam locomotives, which were comparable to the Diesels.

Exhibit 4

OPERATING COSTS PER MILE FOR STEAM, DIESEL, PASSENGER LOCOMOTIVES, NEW YORK CENTRAL RAILROAD, 1945

	Steam	Diesel
Repairs	$0.356	$0.352
Fuel	0.410	0.280
Water	0.031	0.004
Lubrication	0.011	0.030
Other supplies	0.005	0.002
Engine-house expenses	0.100	0.100
Vacation and social security	0.0233	0.0237
Crew wages (2 men)	0.1944	0.1970
Depreciation, interest, insurance	0.0853	0.1194
Total	$1.2160	$1.1080

Source: P. W. Kiefer, "An Evaluation of Railroad Motive Power," *Railway Age*, August 23, 30, 1947. Costs for steam locomotives based on 288,000 miles per annum. Costs for Diesel locomotives based on 324,000 miles per annum.

The steam locomotives in the New York Central experiment were used in passenger traffic for an average monthly distance of 25,168 miles. The Diesels averaged 29,021 miles per month. The lower mileage for steam locomotives in the test was traceable to an average time out for repairs of twenty-eight days per annum. With Diesels, repair time was reduced to twelve days per annum. Steam locomotives also were more affected by adverse weather than were Diesels. Exhibit 4, therefore, is constructed to show a service availability of eight hours for steam for every nine hours for Diesel. This service availability ratio is reflected in the 324,000 miles per annum for Diesels as compared with 228,000 miles for steam. Based on these mileages, the New York Central experience indicated that costs for operating Diesels were 10.7 cents per mile less than for improved types of steamers.

A substantial part of the operating cost of a locomotive was made up of fixed charges—depreciation, interest, and insurance. Because of the lower initial cost of steam locomotives ($270,000 for a 4-8-4-wheel-arrangement steam locomotive as against $395,000 for a comparable 4,000-horsepower Diesel locomotive), annual fixed charges for steam locomotives in the New York Central test were only $24,453 as against $38,841 for Diesels. The effect of these lower fixed costs on total operating costs per mile for steam locomotives can be seen in Exhibit 4. With lower annual mileages the differential in favor of Diesel locomotives declines, as shown in Exhibit 5.

Exhibit 5

ESTIMATED OPERATING COSTS PER MILE FOR STEAM LOCOMOTIVES AND DIESEL LOCOMOTIVES FOR SELECTED ANNUAL MILEAGES

Annual Mileage		Operating Costs per Mile		Savings by Diesel
Steam	Diesel	Steam	Diesel	
160,000	180,000	$1.284	$1.205	$0.079
222,000	250,000	1.241	1.145	0.096
288,000	324,000	1.216	1.109	0.107

Source: Based on data from F. W. Kiefer, "An Evaluation of Railroad Motive Power," *Railway Age*, August 23, 30, 1947. Annual charges for depreciation, taxes, and insurance: $24,453 for steam locomotives; $38,841 for Diesel.

In applying the New York Central experience to the operating conditions of their own system, Pennsylvania officials noted that the average mileage operated by their serviceable passenger locomotives was somewhat lower than mileages on which the costs of Exhibit 4 were based. Average mileage per passenger locomotive in the Pennsylvania system was estimated at 75,000 per annum.[3] This estimated rate, however, included all types and ages of passenger locomotives and consequently was lower than would be expected from new locomotives. The company's actual experience with new passenger Diesels averaged 240,000 miles per annum. The New York Central experiment, moreover, was for passenger locomotives only; annual mileages for freight locomotives were much lower. For Diesels used by Class I railroads, annual mileage was estimated at 120,000, and for new 5,400-horsepower steam locomotives it was 102,000.[4] Thus company officials believed that mileages, shown in Exhibit 5, of 160,000 for steam and 180,000 for Diesel would be closer than the higher base mileages of the New York Central test to the experience of Pennsylvania main-line locomotives. Aside from depreciation charges, executives of the railroad believed that operating costs of main-line steam locomotives were not greatly different from those of the new types used in the New York Central experiment.

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[3] This is slightly in excess of the "passenger train miles per locomotive" shown in Exhibit 3, because of double-heading and light locomotive movements.

In examining the New York Central experience, officials of the Pennsylvania were impressed with the lower fuel costs of Diesels. While Diesel locomotives used relatively high-cost fuel in terms of B.T.U. content, actual fuel costs for Diesel locomotives were substantially less than those for steam locomotives because of the much greater efficiency of Diesels. A survey of the Interstate Commerce Commission[5] indicated that steam passenger locomotives of the Eastern District roads used an average of 170 pounds of coal per locomotive mile, while Diesels required 2.7 gallons of Diesel fuel to accomplish the same work. In recent years prices of both coal and Diesel fuel had been going up, although the rate of increase of coal was substantially more than that of fuel oil, as shown in the following tabulation:

	Cost in 1940	*Cost in 1946*	*Per Cent Increase over 1940*
Coal per ton (mine purchases)	$1.88	$3.25	72.9
Diesel fuel, per gallon .	0.0442	0.0613	38.7

Based on 1946 fuel prices, the New York Central study arrived at the following fuel costs per mile:

Coal, 170 lbs. @ $3.25 per ton .	$0.276	
Transportation & storage	0.134	
Diesel fuel: 2.7 gal. @ $0.0613 per gal.		$0.166
Transportation & storage		0.144
	$0.410	$0.280

It seemed to the Pennsylvania officials that a cost of $0.134 per mile for transportation and storage of coal was somewhat high in view of the company's proximity to coal deposits. On the other hand, transportation and storage charges for fuel oil would probably be as high as the New York Central figures indicated, since it would be necessary to transport it from the Southwest, outside the Pennsylvania's network and with consequent out-payment for transportation expense.

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[4] P. W. Kiefer, "An Evaluation of Railroad Motive Power," *Railway Age*, August 30, 1947.

[5] Statement M-230, December, 1946

Special processing of water for steam locomotives was necessary at practically all water stations west of Harrisburg. These facilities consisted of large overhead tanks, equipment for chemical treatment, and pumping machinery where gravity flow was not available. For Diesels, on the other hand, no special facilities were required, as water was treated on the locomotives. No abandonment of main-line water stations was contemplated, as it was recognized that operation of some steam power would continue for many years.

Fueling facilities, because of the greater operating span of the Diesel, could be reduced in number, although new facilities would be required to handle liquid fuel, if Diesels were used. The Pennsylvania estimated that approximately $2,500,000 would be adequate for installation of fueling facilities necessary to inaugurate Diesels, should they be used.

Moreover, Diesel locomotives, being very intricate pieces of machinery in contrast with the relatively simple steam locomotives, would require the establishment of extensive shop facilities. Here, however, because of the greatly expanded range of the Diesel, not so many shops would be maintained as would be required for steam locomotives. In converting to Diesel, the Pennsylvania officials estimated that a large passenger Diesel repair shop would be needed, at a cost of approximately $4,200,000, and a freight Diesel shop, estimated at about $3,000,000. It was probable that these repair shops would be located near the lines of heaviest traffic, preferably at Harrisburg.

In addition, smaller repair and storage facilities would be necessary if Diesel power were used. Such shops would be located over the western end of the system, at such places as Chicago, St. Louis, and Crestline, Ohio. It was contemplated that space in existing enginehouses would be used and that modifications of such space would require an outlay of $500,000 for each of six shops. Facilities of this sort were usually amortized in twenty years.

One of the most difficult problems which the management foresaw for the road, in converting to Diesel power, was the retraining of operating and repair personnel. Because of the seniority system enforced by the Railway Brotherhoods, engineers of steam locomotives were generally older men who had attained their positions only after many years of service with the road. This made retraining difficult. To a lesser extent, these obstacles would be encountered in the repair departments. The personnel department estimated costs of retraining personnel and pensioning superannuated employees at about $500,000 to be spread over three years.

Eventual replacement of the 4,372 steam locomotives of the Pennsylvania system by Diesels, if accomplished, would involve a substantial cash outlay by the company, but it was anticipated that conversion could be undertaken gradually as funds for reinvestment became available. The company's financial position was extremely strong, and until 1946 there had been an unbroken record of net earnings for one hundred years. In 1946 the deficit was attributable largely to the disproportionately high volume of commuter service, short-haul L.C.L., express, and mail handled by the Pennsylvania at relatively low rates. It was impossible in the short run for the Pennsylvania to reduce its expenses in proportion to the decrease in its revenue. The management believed, however, that after a year of readjustment to more normal operation, a more favorable balance between revenue and expense would again be established.

To assist the roads in postwar readjustment, the Interstate Commerce Commission granted certain rate increases. The Pennsylvania had received a 6 per cent temporary freight rate increase in July, 1946. As of January 1, 1947, this increase was raised to about 17.6 per cent on freight rates. Effective on June 1, 1947, was an increase in passenger fares for coaches from 2.2 to 2.5 cents per mile, and in Pullmans from 3.3 to 3.5 cents per mile.

With the tremendous volume of freight and passenger traffic handled during the war years, revenues of the Pennsylvania system increased greatly, as may be noted from Exhibits 2 and 3. Both revenues and earnings dropped off markedly after the war to new postwar levels, which, however, were well above prewar levels. Since the Pennsylvania Railroad System was located in the primary industrial area of the nation, management believed that its revenues would not materially decline in the near future. But it was noted that 32 per cent of the company's revenue and 58 per cent of total weight in 1946 came from hauling mineral products, chiefly coal. Possible declines in the production of coal as industry and transportation agencies converted to the use of other fuels suggested a decline in one source of revenue. It was not believed that the company's change from steam to Diesel power would have any marked effect in accelerating the general movement of industry to abandon coal as a fuel.

Related to this problem was the supply of coal as compared with that of fuel oil. Rapid conversion of industrial and domestic consumers from coal to petroleum products had created a shortage of oil in the years immediately following the war. While this condition was regarded by some executives as likely to be of short duration, certain leaders in the rail industry were extremely wary of the dangers inherent in an uncertain supply of oil.

By the end of 1946 the Pennsylvania Railroad had not yet adopted a definite policy of conversion to Diesels. In his annual report for 1946 the president of the road, Mr. M. W. Clement, stated:

> During the year, thirty-seven steam locomotives and tenders were received. . . . These are the most powerful passenger steam locomotives in our service. . . . There were on order at the close of the year twenty 6,000 horsepower passenger and two 7,500 horsepower freight Diesel-electric locomotives, scheduled for delivery in 1947. Since the close of the year, nineteen additional 6,000 horsepower passenger and six 7,500 horsepower freight Diesel-electric locomotives were placed on order.

Further Diesel orders were placed during 1947, and in the *Chicago Tribune* on March 25, 1948, there appeared the following:

> The Pennsylvania railroad has placed orders for 114 additional Diesel-electric locomotives . . . in connection with its 157 million dollar improvement program, M. W. Clement, president, announced yesterday. These orders bring the road's total since the war to 374 diesels.
>
> We are well under way, said Mr. Clement, on one of the largest Diesel locomotive installations in the country. By May of this year we expect all of our important east-west through passenger trains will be handled by diesel power in the non-electrified territory west of Harrisburg, Pa. Our Diesel switcher program also is extensive.

QUESTIONS

1. Was the Pennsylvania Railroad justified, on the basis of operating costs, in converting from steam power to Diesel power in the postwar period of 1946–48?
2. How would the prospect of a substantial decline in traffic affect calculations to convert to Diesel locomotives?

Effects of Changes in Prices of Input Factors on Cost

Case III–9: MAYFLOWER SHOE CORPORATION[1]

The Mayflower Shoe Corporation of Brockton, Massachusetts, was a manufacturer of high-quality men's shoes. Its products, marketed under the brand name "Mayflower," enjoyed an excellent reputation among high-income customers of quality shoe stores. A medium-sized firm of approximately five million dollars in total assets, the corporation was generally regarded as progressive and well managed.[2]

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[1] Fictitious name.

In the spring of 1939 the corporation was faced with a demand on the part of the union, to which all its employees belonged, for a 10 per cent advance in piece rates and corresponding changes in hourly wage rates. Several members of the shoe manufacturers' trade association, of which Mayflower was also a member, indicated their intention to accept the union's demands. The management of the Mayflower Corporation believed it had no alternative but to agree to the higher wage rate. If accepted, the new rates would apply to the fall production season, which began July 1.

The president of the company asked the controller to prepare estimates of the probable effect of the increased wage rates on total costs of production. The president was aware that leather costs had in the past accounted for 50–60 per cent of total costs and that labor costs constituted 25–30 per cent of the total, depending on the styles and types of shoes in the "sales mix." Leather was bought on the open market, and the purchasing of the quantities used by Mayflower had a negligible effect on market price. The president knew that no cost reductions could be expected in that quarter to offset the rise in wages.

All the shoemaking equipment in the Mayflower factory was leased from the United Shoe Machinery Corporation. For most of the equipment Mayflower was charged a royalty based on volume of production, which was measured by the number of pairs of shoes processed. For certain machines, where there was no satisfactory measure of production, the lessor charged a straight monthly rental. Charges of this sort ranged from 19 to 26 per cent of the combined royalty and rental costs of the company in the period 1930–38. The United Shoe Machinery Corporation maintained a large staff of service representatives, who kept the machinery in excellent repair. These representatives were in the plant almost daily and worked intimately with shop foremen of the Mayflower Corporation.

For nearly ten years the corporation had operated a standard cost accounting system. The purpose of the system was twofold:

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[2] Material for this case is derived in part from *T.N.E.C. Monograph No. 5: Industrial Wage Rates, Labor Costs, and Price Policies* (Washington, D.C.: Government Printing Office, 1940), pp. 4–25.

(1) to enable the company to establish selling prices based upon estimated costs and (2) to provide a standard for comparison with actual performance. The calendar year was divided, for budgetary purposes, into two six-month operating periods: the spring season beginning on January 1 and the fall season beginning on July 1. A few weeks in advance of each season the management was accustomed to prepare operating budgets for the ensuing season. The first step was to prepare an estimate of sales from figures supplied by the salesmen and reviewed by the sales manager, controller, and president. A production schedule was then prepared for both contract and stock shoes, with a view to keeping the plant operating on a steady month-to-month basis. Other steps in the preparation of standard unit costs were summarized in the corporation's accounting instructions as follows:

> Material costs are figured from a standard estimate of leather required for each type of shoe based on figures supplied by a subsidiary of the United Shoe Machinery Corp. These materials are priced for the cost budget at a weighted average of the price of stock on hand and the expected cost for the additional quantity required during the next season. Labor costs are built up from piece rates on particular styles and makes of shoes, to which is added an allowance for labor paid on an hourly or day basis.
>
> The labor cost catalog contains over 25,000 piece prices for the various operations needed to manufacture all styles and grades of shoes, as well as the standard day work allowances by departments. The latter are computed by dividing the estimated day work pay roll for each department by the estimated average production. To arrive at a per-pair labor cost figure by departments for any style of shoe, the piece prices of the operations called for by that style are added to the standard day work allowance for each department.
>
> The other per-pair costs are figured from the production budgets prepared earlier. The manufacturing expense allowance per pair is calculated by dividing the total budgeted manufacturing expense by the estimated volume of production in number of pairs. The selling and administrative expense allowance is expressed as a percentage of the selling price, a percentage computed as the ratio of budgeted selling and administrative expenses to budgeted dollar sales.
>
> Royalty and rental costs per pair, which are the charges for machines leased or rented from such companies as the United Shoe Machinery Corporation, are computed along with other items in manufacturing con-

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[*] "Day work" includes direct labor on operations where piece rates have been found unsuitable and indirect labor, such as the boys who assist piece workers in actual production and those who look after the repairing of damaged shoes. Other indirect labor, such as rack pushers, janitors, and other maintenance men, is included in "manufacturing expense."

> stant by dividing the estimated charges, including rentals (on a time basis) and royalties (on a per-pair basis), by the budgeted production. Other costs, such as commissions and discounts, are expressed as percentages of the factory selling price of the particular shoe.
>
> Standard factory costs (labor, materials, and manufacturing expenses) usually remain unchanged throughout each season, and differences which may develop between actual and standard costs are reflected in monthly "variation reports." If shoe prices are changed in the middle of a season, the other standard cost items such as commissions, discount, selling and administrative expense which are all computed as a percentage of selling price, are refigured. At the beginning of the next season, all standard costs are recomputed in the light of changed market and labor conditions.[4]

Thus there was a lag between the time when changes in wage rates were made and the time when they were reflected in standard costs. For example, a wage change made in July or August would not be

Exhibit 1

STANDARD PIECE-RATE COSTS AND TOTAL LABOR COSTS, 1931-39

(1932 Average = 100)

Date	Index of Piece Rate Cost per Pair	Index of Total Labor Cost per Pair	Date	Index of Piece Rate Cost per Pair	Index of Total Labor Cost per Pair
1931:			1935:		
Spring	117.1	118.0	Spring	111.6	112.5
Fall	111.4	115.6	Fall	108.8	105.7
1932:			1936:		
Spring*	113.0	111.2	Spring	110.2	107.1
Fall†	86.5	88.8	Fall	114.5	110.1
1933:			1937:		
Spring	‡	‡	Spring	114.5	111.6
Fall	95.4	87.3	Fall	119.0	116.0
1934:			1938:		
Spring	‡	‡	Spring¶	117.5	114.2
Fall§	120.6	108.8	Fall	119.0	119.2
			1939 Spring	119.5	119.2

* Piece rates were cut 4.8 per cent on November 16, 1931.
† Day rates were cut 10 per cent on May 2, 1932, and piece rates 20 per cent on May 31, 1932.
‡ Not available.
§ Piece rates were increased 10 per cent and day rates 20 per cent on August 14, 1933, and piece rates were increased another 10 per cent on February 12, 1934.
‖ Piece rates were increased 5 per cent on February 15, 1937.
¶ Piece rates were increased 4.75 per cent and day rates 5 per cent on August 16, 1937, and cut by the same amounts on November 8, 1937.

Source: *T.N.E.C., Monograph No. 5, Industrial Wage Rates, Labor Costs, and Price Policies* (Washington, D.C.: Government Printing Office, 1940), p. 14.

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[4] *T.N.E.C. Monograph No. 5*, pp. 11-12.

Exhibit 2

CHANGES IN WAGE RATES, STANDARD PIECE-RATE COSTS, AND STANDARD TOTAL LABOR COSTS, 1931–37

Date of Wage Change	Change in Piece Rates	Per Cent Change in Piece-Rate Costs, Season to Season	Change in Hourly Rates	Per Cent Change in Total Labor Costs, Season to Season
Nov. 6, 1931	Decrease of 4.8 per cent	1.2		− 3.8
May 31, 1932	Decrease of 20 per cent.	− 23.5	Decrease of 10 per cent*	− 20.1
Aug. 14, 1933	Increase of 10 per cent		Increase of 20 per cent†	
Feb. 12, 1934	Increase of 10 per cent	−26.4‡		+24.6§
Feb. 15, 1937	Increase of 5 per cent	+4.7		+3.9
Aug. 16, 1937	Increase of 1.75 per cent		Increase of 5 per cent	.....
Nov. 8, 1937	Decrease of 1.75 per cent	− 2.0	Decrease of 5 per cent.	− 1.6‖

* The decrease in hourly rates was made on May 2, 1932.

† Hours reduced from 48 to 40 per week, with no change in normal weekly earnings.

‡ No cost data were available for the spring of 1934, so it is necessary to compare the two wage rate increases with changes in piece-rate costs over the year from the fall of 1933 to the fall of 1934.

§ This is again the increase in labor costs over the year period from the fall of 1933 to the fall of 1934.

‖ The increase of August 16, 1937, and the decrease of November 8, 1937, both took place within a single season. Hence the cost figures should not reflect either of them.

Source: T.N.E.C. *Monograph No. 5, Industrial Wage Rates, Labor Costs and Price Policies* (Washington, D.C.: Government Printing Office, 1940), p. 14.

figured in standard cost estimates until mid-December, to apply to the season opening January 1.

In preparing estimates of the effect of the prospective wage increases of July 1, 1939, on costs, the controller reviewed the relationships which had prevailed in the past between wage changes and standard piece-rate costs per pair and between standard piece-rate costs and total labor costs. The results of his survey are presented in Exhibits 1 and 2. The controller noted that from the fall of 1932 to the fall of 1933 there was an advance of almost nine points in the index of piece-rate cost and that from the fall of 1934 to the spring of 1935 there was a decline of nine points. These changes in piece-rate costs he attributed in large part to the shifting of certain operations from piece work to an hourly basis and vice versa. He regarded these cases as exceptions to the usual movements of piece rates and labor costs.

To determine the bearing of shifts in labor costs on total manufacturing costs, the controller prepared a breakdown of the following cost components: labor, materials, manufacturing constant (overhead), and total factory cost. These data are presented in Exhibit 3. On the basis of these studies the controller recommended to the president that the prices of shoes sold by the company be advanced 10 per cent for the fall season beginning July 1, 1939.

Exhibit 3

STANDARD COST COMPONENTS, TOTAL FACTORY COST, FACTORY WHOLESALE PRICE, AND SALES IN PAIRS, 1931–38

(1932 Average per Pair = 100)

	Labor	Materials	Manufacturing Constant Overhead	Total Factory Cost	Factory Wholesale Price	Sales in Pairs
1931:						
Spring	118.0	113.0	111.6	124.7	118.0	152.7
Fall	115.6	127.1	101.4	118.9	118.0	100.0
1932:						
Spring	100.0*	100.0*	100.0*	100.0*	100.0*	111.7
Fall						88.3
1933:						
Spring	†	†	†	†	†	70.2
Fall	87.3	93.1	98.7	92.7	95.5	88.0
1934:						
Spring	†	†	†	†	†	66.8
Fall	108.8	109.7	97.3	107.0	101.1	57.6
1935:						
Spring	112.5	98.0	97.3	101.7	95.5	†
Fall	105.7	101.0	93.9	100.8	95.5	†
1936:						
Spring	107.1	108.9	92.0	105.1	101.1	72.0
Fall	110.1	112.0	89.0	106.9	101.1	84.6
1937:						
Spring	111.6	114.2	92.8	100.2	101.1	89.3
Fall	116.0	128.6	100.2	119.6	114.6	64.1
1938:						
Spring	114.2	115.6	103.6	112.8	112.4	64.1
Fall	119.2	107.4	108.2	110.7	112.4	60.9

* Only the average for the entire year 1932 is shown, as the figures for each season reflect a change in the construction of the shoe. As a result of this change all the figures beginning with spring, 1933, are for a shoe which cost somewhat less to construct than the shoe made prior to 1932 was to have cost.

† Cost data not available.

Source: *T.N.E.C. Monograph No. 5, Industrial Wage Rates, Labor Costs, and Price Policies*, Washington, D.C., Government Printing Office, 1940, p. 17.

Shortly after the controller had submitted his report to the president, the sales manager offered an alternative recommendation. He believed that, in a highly competitive market, a 5 per cent reduction in the factory price of their products would stimulate demand to the point where the larger volume would result in lower unit costs of manufacture and greater profits for the company.

QUESTION

1. Which recommendation should the president of the Mayflower Shoe Corporation accept?

Part IV

PRICING AND PRICE POLICIES

IN ITS SALES policies a business company selects the best means for obtaining satisfactory revenues. In the first place, there is the possibility of increasing profits through selecting a more successful product or combination of products, that is, through adding and dropping lines. Resultant changes in "sales mix" are an everyday occurrence in most businesses. The company can also modify and improve existing products with a view to enhancing its sales position. Considerations such as these constitute the company's "product policy." There may also be possibilities of increasing sales through promotional effort, such as advertising. Still other adjustments of sales policies lie in the direction of extending services, such as transportation, credit, and technical assistance to the buyer. Finally, there are the basic possibilities of changing prices and volume of production. All these adjustments have the common objective of increasing or maintaining profits. To some extent the various types of adjustments are alternatives, i.e., one line of action can be chosen in place of another. And to some extent these various moves supplement one another. A company may, for example, elect not only to improve its product but also to spend money in advertising the improvements.

In Part IV we are concerned with pricing and price policies, as distinguished from other types of adjustment, which can be called "nonprice competition." The latter constitute the subject matter of Part V.

THE ECONOMIC THEORY OF PRICE

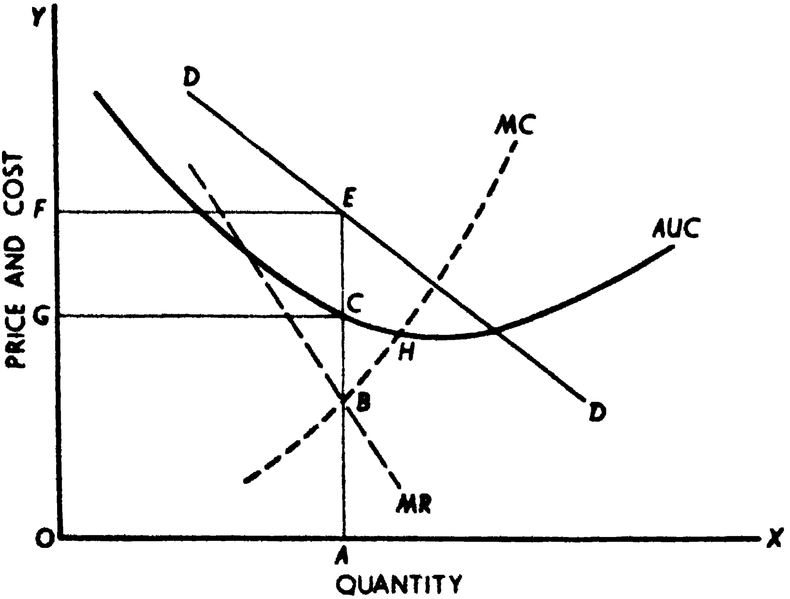
As it pertains to the pricing operations of an individual firm, economic theory offers an exact solution to the problem of determining price. The business firm is conceived as having ascertainable schedules of demand and cost. The demand curve summarizes the reaction of the market, in terms of quantity taken, to a series of possible prices which the firm might set. It is based on buyers' wants (conditioned, perhaps, by advertising). It reflects as well the existence of substitutes and the relative terms on which these substitutes can be obtained. The firm's cost curve, in all situations except the immediate short run when a stock of goods is to be disposed of, describes the conditions of supply. The costs of different-sized outputs vary, and, in periods long enough to permit their operation, price changes for input factors, changes in technology, and variation in size of plant also affect costs.[1]

Marginal Analysis

Since the demand curve presents the schedule of prices at which the firm can sell different quantities on the market, it is the curve of average revenue (total dollar sales ÷ number of units sold). The corresponding cost curve indicates the average costs of producing a unit of product. Both demand and cost can be stated alternatively as marginal schedules or curves. When the curves are thus presented, they indicate the effect on total revenues and cost of selling (or producing) one more unit of output.[2]

Exhibit 1

EQUATION OF MARGINAL REVENUE AND MARGINAL COST BY A BUSINESS FIRM



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[1] The introductions to Parts II and III outline in more detail the concepts of demand and cost

[2] See pp. 58-59, 152-53

By consulting his marginal curves of revenue and cost, the entrepreneur determines what output he can most advantageously produce and sell. It is the output at which marginal revenue exactly equals marginal cost.[3] To produce more than this amount indicates that the last units add more to total cost than they add to total revenue. To produce less than this amount is to fall into the opposite error, for some expansion of output would then add more to revenue than it would to cost. At no point is the entrepreneur so well off as when marginal revenue is equal to marginal cost. This favorable condition is shown in Exhibit 1.

Market Structure

Thus far the conventional theory of price appears to be more a theory of the firm's output. To demonstrate how price can be independently determined by a firm, it is necessary to explain something about the markets in which entrepreneurs sell their products. For convenience, we shall refer simply to three major types of market structure, though economic theory elaborates many other collateral types. The three types are: pure competition, monopolistic competition, and monopoly. Under pure competition there are many sellers and many buyers dealing in a more or less standardized commodity. So far as the commodity or conditions of sale are concerned, no buyer has any reason to prefer the product of one seller over that of another. And, because each seller produces a small part of the total output which comes to market, he cannot influence the market price. The impersonal forces of aggregate supply and demand determine the market price which the individual seller accepts as given. His only possible adjustment, therefore, is to expand his output up to the point where marginal cost equals the marginal revenue derived from the product. And in this case marginal revenue is the same as the market price. Equilibrium of the firm under pure competition is shown in Exhibit 2.

The monopolist has sole control of a product for which there are no close substitutes; in other words, he controls the entire market supply. Quite obviously, the amount of output which he places on the market will have a major effect on price. He also identifies his demand curve with the market demand curve. Thus the monopolist, unlike the seller in pure competition, has two alternatives: he can control the amount of output which he places on the market (and this affects price), and, having a less than perfectly elastic demand curve, he can set a price for his product.[4] The monopolist, however, like the pure competitor, achieves the greatest net return by equating marginal cost and marginal revenue. The same reasoning applies. The fact that the monopolist has a negatively inclined demand curve leads to the equalizing of marginal revenue and marginal cost at a point on the vertical scale which is less than price (in Exhibit 1, *AB* is less than *AE*). In pure competition, by contrast, not only were marginal cost and marginal revenue equal, but they also equaled price (see Exhibit 2).

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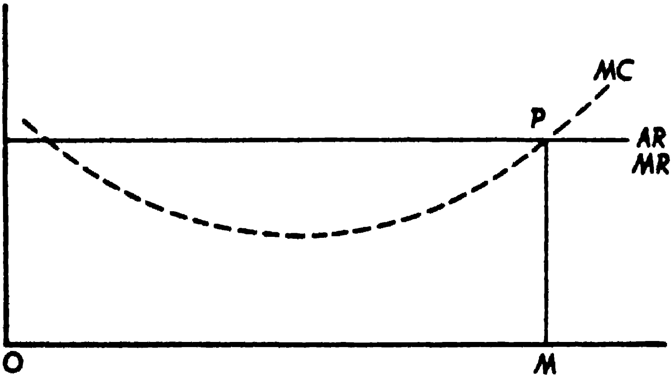
[3] More precisely, the entrepreneur produces the output at which marginal revenue equals marginal cost when marginal cost will exceed marginal revenue for any expansion of output beyond that point.

Exhibit 2

EQUILIBRIUM OF FIRM UNDER PURE COMPETITION



Finally, between the logical extremes of monopoly and pure competition fall most of the actual market structures of the business world. In these markets sellers are described as being in monopolistic competition because each has certain distinctive products which lead buyers to favor him in preference to other sellers, and yet the *differentiated* products of these sellers are reasonably good substitutes for one another. Sellers in this market possess limited monopolies of their products, and the preferences they enjoy may be ephemeral, in that they depend on reiterated advertising appeal, etc., which will tend to be matched after a lapse of time by other sellers.

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[4] As was stated previously, the pure competitor's only alternative is to regulate the amount he puts on the market. But, in his case, this cannot affect price because of the relatively small amount involved.

Both monopolists and monopolistic competitors generally follow the practice of setting the prices for their products before putting them on sale. They are then prepared to sell all that the market will take at the predetermined price. For the most part, theirs is a problem of price policy rather than of output policy.

PRICE POLICY

The foregoing paragraphs state in somewhat abbreviated form the marginal analysis of economic theory as it applies to pricing by the firm. It is a matter of long-standing debate among economists as to the extent to which business behavior conforms to the logical outlines of marginal theory.[5] The consensus seems to indicate that businessmen generally lack the precise knowledge of demand and cost which theorists impute to them. There is also some question whether the simplified logical models of economic theory represent accurately the complex mechanisms of the business world. Our interest in applying economic analysis to business situations compels recognition of the fact that businessmen, at least in the first instance, deal, not with demand curves and cost curves in determining prices, but with numerous special conditions of the market in which they sell their products. These conditions are of two sorts: those pertaining to the internal organization of the firm and those relating to the external structure of the markets in which the firm operates. Before examining these conditions, we turn to a preliminary consideration of the meaning of price policy.

Meaning of Price Policy

To say that a businessman has a price policy necessarily means that he has some degree of latitude in determining the prices of the commodities he has to sell (or perhaps those he wants to buy). In many sections of the economy, of course, no such latitude exists. The farmer, as an individual, for example, can have no price policy with regard to the wheat or cotton he produces. He is so insignificant a factor in the total market that he must simply accept the price as he finds it. . . . In the case of most manufactured products and some raw materials . . .

[5] Recent discussion of marginal theory and price policy includes the following: R. L. Hall and C. J. Hitch, "Price Theory and Business Behavior," *Oxford Economic Papers*, No. 2 (May, 1939), pp. 12–45; Fritz Machlup, "Marginal Analysis and Empirical Research," *American Economic Review*, Vol. XXXVI (September, 1946), pp. 519–54; Henry M. Oliver, Jr., "Marginal Theory and Business Behavior," *American Economic Review*, Vol. XXXVII (June, 1947), pp. 375–83, and "Average Cost and Long-Run Elasticity of Demand," *Journal of Political Economy*, Vol. LV (June, 1947), pp. 212–21; and R. A. Gordon, "Short-Period Price Determination," *American Economic Review*, Vol. XXXVIII (June, 1948), pp. 265–88.

the individual businessman can exercise some discretion in determining the price of his wares. The manufacturer of steel, of automobiles, of corn flakes, or of proprietary drugs has a very real voice in deciding the price at which he will sell. The extent of this discretion varies widely; it is generally, though not necessarily, greater where competing sellers are few than where they are many.[6]

As a result of this command over price, one of the important functions of business management is the adoption of general pricing rules, i.e., price policies which improve the market position of the firm. "The term [price policy] implies that the firm does not adjust its price automatically to every change in expected demand or cost conditions, but follows a line of action that is expected to persist over time in spite of considerable change in market conditions."[7] Price policy indicates the determination of price through reference to a broader set of considerations than is ordinarily understood by cost and demand conditions. The significant pricing activities of a businessman relate to his selection of a price policy; actual price setting is likely to be an administrative action which carries out the policy previously adopted.[8]

Internal Organization as a Determinant of Price Policy

How a company is organized has an important bearing on the price policies it selects. Control over prices is frequently distributed within the firm among several levels of authority. Top management often makes the key pricing decisions, that is, the changes in base prices. Subordinates carry out the complex task of administering discounts, extras, and other terms which constitute the firm's price structure. In June, 1936, when the Interstate Commerce Commission required the eastern railroads to effect a general reduction in

[6] Saul Nelson and Walter G. Keim, *Price Behavior and Business Policy* (*T.N.E.C. Monograph No. 1*) (Washington, D.C.: Government Printing Office, 1940), p. 4.

[7] Conference on Price Research, *Cost Behavior and Price Policy* (New York: National Bureau of Economic Research, 1943), p. 279. See also Corwin D. Edwards, "Pricing Processes and Policies," *Annals of the American Academy of Political and Social Science*, Vol. CCIX (May, 1940), p. 109: "A price policy reflects only market conditions which are widespread and sustained. It reflects changes in these conditions only when they have persisted long enough to convince the management that it is confronted with a trend rather than an aberration."

[8] "The doctrinal problem that confronts the economist is the theory of price; the practical problem that faces the businessman is the policy of price. Price theory and price policy are the obverse and the reverse of the same medal. The economist tries to explain how prices are formed and how they work; the businessman endeavors to select a price policy which will secure for him the greatest profits." (Edwin R. A. Seligman and Robert A. Love, *Price-Cutting and Price-Maintenance* [New York: Harper & Bros., 1932], pp. 2–3.

their base prices from 3.6 cents per mile to 3.0 and 2.0 cents for Pullman and coach, respectively, this was a top-management decision (actually, it was forced on management). Implementation of this reduction in base price was the work of the passenger rate-making divisions of the railroads, which had to recalculate thousands of point-to-point fares. Because of rate equalization and other irregularities in railway rate structures, the general cut in the basic rate could not be applied uniformly across the board. Thus the impact of price policy made at the top filtered through the organization as particular details of price administration were handled at lower levels. Among other effects, the very elaborateness of the administrative process in setting and resetting prices may deter management from making frequent changes. Such a result seems highly probable where companies have published catalogues and where price lists have been distributed to customers.

This suggests the possibility that another feature of internal organization, namely, the planning period, may have a major influence on the selection of price policies. Businessmen as well as economists distinguish between decisions made with reference to the long run and those which look only to the short run. The planning period, whether long or short, determines the considerations which enter into the selection of a price policy. The planning period may be thought of as "the length of time within which the anticipated results on the firm's revenues and costs that motivate a decision are exhausted."[9] The length of this period varies from industry to industry and from firm to firm. In retail trade it is customary to plan merchandising operations (purchasing, financing of inventories, sales planning) by six-month periods. Although individual prices are subject to change more frequently, the general level of prices within a six-month season tends to hover around the planned mark-up for the period. In the automobile industry, on the other hand, the model year is the usual planning period. The sale of a promotional lot which a department store picks up in the market indicates a short-term price decision. On the other hand, long-run price decisions arise when a new product is introduced, when channels of distribution are changed, and when a new price line is adopted.

Other aspects of internal organization also account for the selection of particular price policies. An intangible but highly influential factor is the personal outlook of the entrepreneur where a single individual holds a position of great power in a large corporation. Price policies in the early days of the automobile industry were in no small degree traceable to the insistence on low prices and mass distribution by Henry Ford. Price cutting in the rubber tire industry, where a small number of large firms dominates, may have resulted from the personal influence of Firestone.[10] Recently the position of the Great Atlantic and Pacific Tea Company has exerted a downward pressure on retail food prices, and this may be traceable to the personal outlook of Mr. John Hartford.[11]

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[9] *Conference on Price Research, op. cit.*, p. 270.

Market Structure as a Determinant of Price Policy

The conditions of competition which prevail in the market directly affect the price policies which business companies select. The nature of competition, in turn, is determined by the institutional structure of the market. Economists, in developing this explanation of competition, are accustomed to classify market structures primarily with regard to the numbers of sellers and buyers in these markets and with regard to the degree of differentiation of the product. These characteristics of market structure are obviously among the most important factors governing the firm's selection of price policies, but in the discussion which follows we shall refer, as well, to other aspects of market situations.

When a large number of sellers and buyers is active in a market and when no one firm is so large as to dominate, no individual company is able to pursue a price policy; the market price, determined by the interaction of the large numbers on either side, governs. Only in the limited sense of staying out of the market or of buying or selling more heavily than current requirements can a firm have a price policy (this might more properly be called a "volume" policy). The case is different where one or a small number of firms constitutes the whole market. The influence of the individual firm's price on the market price is then evident. With a small number of firms, a price policy—some consistent line of action—is necessary. But, even under these conditions, if firms are of different size, smaller firms may find that they can enforce no price policy of their own. Sooner or later it becomes evident that it is to their interest to adopt the prices set by larger firms. Thus not only numbers but size of firms determines the character of price policies.

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[10] Clair Wilcox, *Competition and Monopoly* (*T.N.E.C. Monograph No. 21*) (Washington, D.C.: Government Printing Office, 1940), p. 49.

[11] M. A. Adelman, "The A. and P. Case: A Study in Applied Economic Theory," *Quarterly Journal of Economics*, Vol. LXIII (May, 1949), p. 241.

Whether there are numerous and close substitutes has an important bearing on the price policies adopted by business companies. Prior to 1941 the Aluminum Company of America was the only producer of aluminum ingot in the United States. As a monopolist, the company could have set higher prices than it actually did. There is some evidence to show that in the twenties the company held aluminum prices low enough to discourage production of other light-metal substitutes. In industries where there is more than one producer, the several competitors, in an effort to escape price competition, may differentiate their products. Especially in consumer goods, differentiation of products is widespread. This is accomplished by branding, packaging, design, and technical distinctions, and the differences (in the consumer's mind) are emphasized by advertising. A Chevrolet is not an exact substitute for a Ford, and yet, despite the limited protection afforded by differentiation, these automobiles are very definitely in competition with each other.

Aside from differentiation, other aspects of the product have a marked effect on price policies. A consumer good is likely to require a different price policy from an industrial good. In the one case buyers are numerous, relatively uninformed, household consumers; in the latter they are predominantly skilled purchasing agents, primarily concerned with the technical properties of the product. Durable goods, whether consumer or industrial, are also likely to require different price policies from nondurables and industrial supply items. These latter are purchased from day to day and week to week and are generally in more elastic demand than durables.

Other aspects of market structure, significant in the selection of price policies, include distributive channels. In a general way, the longer the distributive chain, the less flexibility there is likely to be found in price policies. A packer of frozen foods announced price reductions of 2–7 cents a package and simultaneously eliminated wholesalers from his distribution channels.[12]

Various aspects of cost have an important bearing on price policies. The degree of current control of production, i.e., the length of the production period, may determine how rapidly changes in raw material and labor costs affect final prices. The manner in which unit costs vary with different sizes of plant may also affect the price policies of different companies. Variations in cost resulting from short-run fluctuations in output can influence price policies. In this connection it is interesting to note that the automobile companies, which accept the model year as their planning period, take no cognizance in price policy of short-term fluctuations in the rate of production.[15] It is difficult to see how they could.

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[12] *New York Times*, August 11, 1949.

This by no means exhausts the list of market phenomena which influence price policy. It is probable that the age of an industry has something to do with its pricing policies. It is not simply that the older industries tend to be more conservative in outlook; there seems to be also the very real problem, especially in durables, of market saturation. The electric refrigerator industry, which experienced very little decline in the depression of 1932–33, found that the change to a replacement market necessitated different price policies following the depression of 1937–38. Other aspects of market structure exerting strong influence are customary prices and price differentials. Price in some markets becomes so identified with a certain level that adjustments cease to be made in price policy. In retail trade, price lines sometimes remain unchanged for years. The full impact of adjustment then falls upon product variation, advertising, and other forms of nonprice competition. Another dimension of market structure significant for price policy is the existence of patents, trade-marks, and other legalized restraints on competition. Because these confer partial monopolies on the seller, prices in these markets are frequently stabilized in the short run.

Finally, the presence of governmental control over conditions of competition sets limits for the exercise of price policy. It is highly probable that the anti-trust activities of the government have led to the development of certain price policies which might otherwise not have appeared. In the absence of legal barriers to price agreements, there seems little reason to doubt that many industries would have found it convenient to follow the practice, sanctioned abroad, of forming cartels openly. Government action has also influenced the price policies of business companies through resale price maintenance and unfair practice laws. Even where certain products have not been "fair-traded," there is reason to believe that the nature of the markets in which they are sold has been affected by the presence of numerous competing products which are legally price-maintained. The packaged liquor market in New York State, after passage of the Feld-Crawford Act (resale price maintenance) presents an example of the effects of government control on the prices of consumers' goods. Perhaps no single piece of legislation has more directly affected business price policies than has the Robinson-Patman Act, passed in 1936, which forbids price discrimination on the part of sellers among buyers. The aim was to place large and small buyers on the same footing, so far as price was concerned.

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[15] Homer B Vanderblue, "Pricing Policies in the Automobile Industries," *Harvard Business Review*, Vol. XVIII (summer, 1939), pp 385–401. For a different evaluation of the effects of cost on price policies see Joel Dean, "Pricing Policies and Cost Analysis," *Proceedings of the National Association of Cost Accountants*, June, 1949, pp 27–38

SOME TYPES OF PRICE POLICIES

The case materials in Part IV of this volume have been organized under the heads of various types of price policies rather than under the heads of different types of market structure. The latter plan, which is more common in textbooks on economics, calls for a discussion of pure competition, of monopoly, of oligopoly (few sellers), oligopsony (few buyers), and of monopolistic competition (many sellers with differentiated products). The arrangement followed in this volume was chosen because of the authors' belief that the problem faced by the businessman is not so much that of selecting a certain logical pigeonhole in which to file away his "case" as it is that of deciding which of a number of alternative price policies is most appropriate for his company. A business firm always starts from a specific market situation: the problem for management is to select a policy which seems most advantageous in this situation.

The organization of the case materials by types of price policies rather than in terms of market structure should not obscure the intimate relation between the two. As indicated above, the price policies selected by management are an outgrowth of both the firm's internal organization and the external market situation. In any given situation more than one price policy may be appropriate. It is to be expected that, under some circumstances, several policies can be used as complementary parts of the whole strategy of the firm. Thus in the steel industry geographic considerations, as well as the large size and small number of firms in the industry, have led to adoption of the basing-point system of pricing. Moreover, the dominant position of the United States Steel Corporation has placed it in the position of price leader in the industry. There is also the price structure as well as base prices to consider, and this gives rise to policies of differential pricing.

Price Agreements

Under some conditions of market structure, business companies have acted in concert to establish uniform market prices. Although many price policies attempt to accomplish this objective through indirect methods, there are two conditions under which price conventions operate to set price directly: (1) where the number of sellers is small enough to permit easy control of price and (2) where government intervention has provided the framework for large numbers of sellers to adopt a common price.

Agreements among a few sellers who set prices for their industry are prohibited by law as conspiracies in restraint of trade. Despite the illegality of such action, price agreements have frequently been made in industries where conditions are favorable to this end. The government, through the Federal Trade Commission and the Department of Justice, has sought to bring such agreements to light and prosecute the parties under the anti-trust laws.[14] It is probable, however, that price agreements are far more numerous than published information would indicate.

Increasingly, business companies are looking to the government not only to permit price agreements among sellers but also to supply enforcement machinery. A striking example of this sort of price-agreement technique was found under the N.R.A. codes. "Soon after he took office in 1933 the administrator announced that, although conduct in accordance with approved codes was exempt from prosecution under the anti-trust acts, it was not intended to authorize price agreements. Nevertheless, 560 of the first 677 codes contained some provision relating to minimum prices or costs."[15] Only twelve of these codes, however, empowered the code authority to establish minimum prices without reference to cost of production. The most important codes permitting direct setting of prices were those in the

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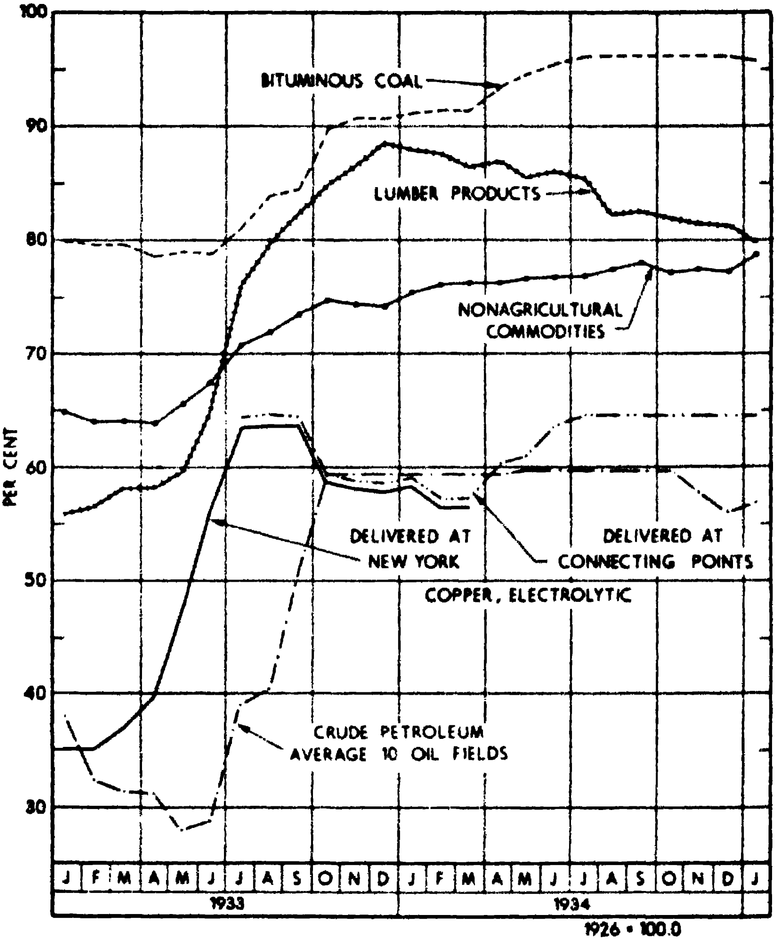
[14] From 1920 to 1940 the Federal Trade Commission issued cease and desist orders involving price agreements in the following industries: viscose rayon yarn, pin tickets, flannel skirts, turbine generators and condensers, liquid chlorine, medical cotton goods, calcium chloride, corn cribs and silos, certain types of waterworks and gas-system fittings, fire-fighting equipment, pulverized iron, rubber heels, music rolls, lithographed labels, plumbing supplies, fertilizer, metal lath, gasoline, and brushes (Wilcox, *op. cit.*, p. 132).

[15] Arthur Robert Burns, *Decline of Competition* (New York: McGraw-Hill Book Co., Inc., 1936), pp. 471–72.

Exhibit 3

PRICES OF BITUMINOUS COAL, LUMBER, COPPER, AND PETROLEUM, 1933-34



Source: Arthur R. Burns, *Decline of Competition* (New York: McGraw-Hill Book Co., Inc., 1936), p. 469. Courtesy of publisher.

bituminous coal, lumber, and petroleum industries. The immediate result was an abrupt rise in prices in these industries, as indicated in Exhibit 3. Because of the difficulties of enforcement and lack of general agreement as to the desirability of prices set by the code authority, there was widespread evasion. In the case of the coal industry, subsequent legislation attempted to carry on industry-wide price making after the N.R.A. was declared unconstitutional.

Price Leadership

Price leadership is a practice in which most units of an industry adopt the price announced by one member of the industry. Ordinarily, this member is the largest firm in the industry. The United States Steel Corporation, for example, is the acknowledged price leader in the steel industry.[16]

Exact following of the price leader by all firms in the industry is rarely found. Occasionally other firms may initiate price changes, and there may be lags in adjusting prices to those of the leader. When demand is strong and sales are at a high level, there may be more disposition to follow the leader than when demand is weak and sales are declining. In the latter case, temptation to cut price is strong. Leadership is usually more carefully followed when price is reduced than when price is advanced, but this also depends on general market conditions. In the postwar period, for example, the smaller manufacturers of motor cars placed their prices at higher levels than did the Big Three.

The largest firm assumes leadership because of its recognized influence on the market price. Its financial resources and large productive capacity enable it to enforce leadership. Other members of the industry may also look to the leader for guidance in pricing because the dominant firm is expected to have better knowledge of costs of production and marketing.

Price Stabilization

Price stabilization relates to the behavior of prices over time. Prices which are stable change little; complete stability means absence of all change. But, obviously, all prices change somewhat, given a sufficient lapse of time. Price stabilization, therefore, is a relative term; some prices are more stable than others. During the depression of 1929–33, for example, prices of copper and hides declined over 70 per cent. Prices of agricultural implements and anthracite coal, on the other hand, declined hardly at all. The latter are stabilized, inflexible, or insensitive prices; the former are flexible or sensitive prices.

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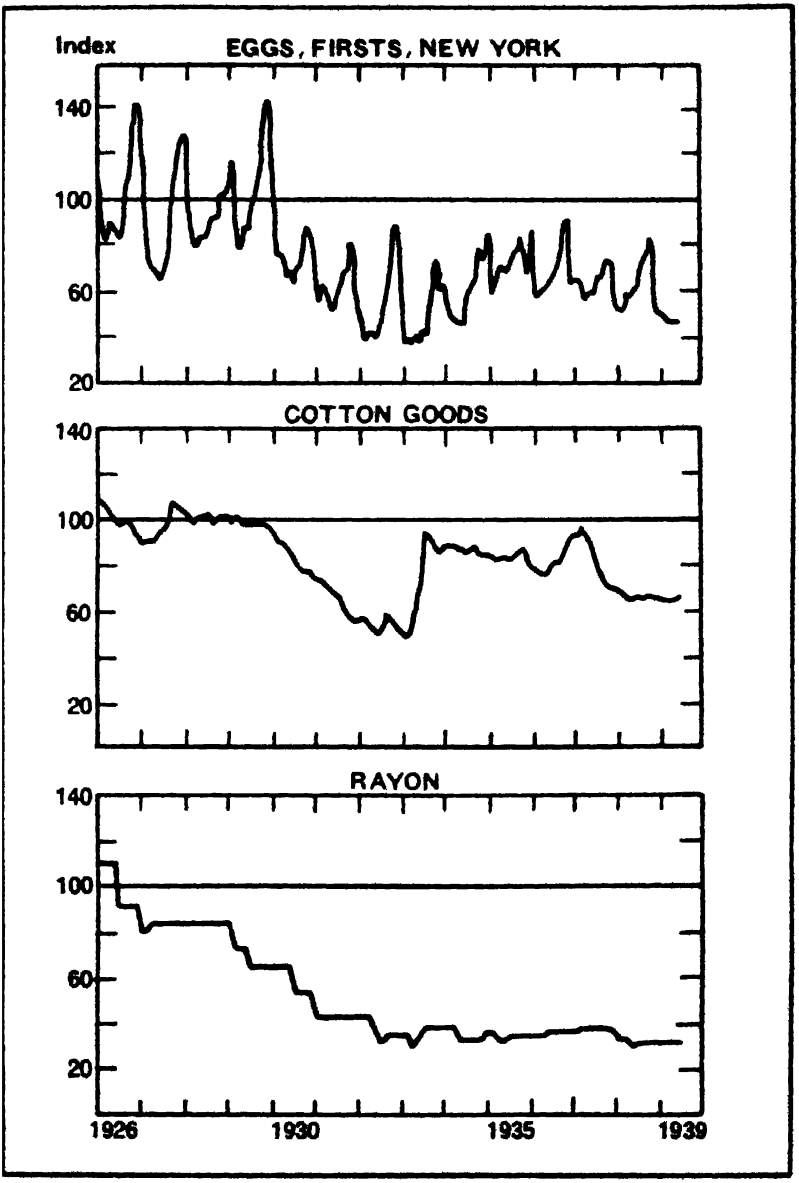
[16] A special form of price leadership, basing-point pricing, is explained in Case IV-3, "The Steel Industry," pp. 272 ff.

Exhibit 4

WHOLESALE PRICES OF SELECTED COMMODITIES, 1926-39
(1926 = 100)



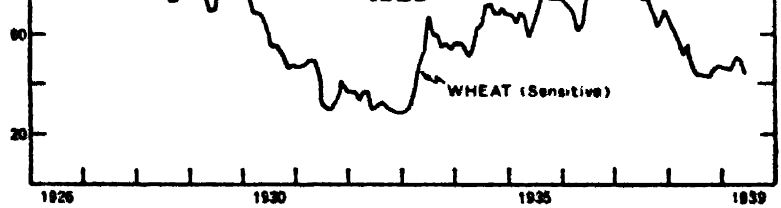
Source: *T.N.E.C. Monograph No. 1*, p. 25.

Changes in price can be grouped into four categories: casual variation, seasonal variation, cyclical change, and secular trend. The first is characterized by irregular movement, follows no pattern, and is unrelated to the general price level. The second offers a recurrent pattern of variation with annual periodicity. The third follows broad swings of the general price level in periods of prosperity and depression, while the fourth shows a persistent, long-term movement of its own, independent of the general price level. Exhibit 4 illustrates seasonal, cyclical, and secular price movements of three selected commodities. The price policies of business companies can have to do with any of these types of price movements, but the policy of price stabilization is peculiarly significant in considering cyclical movements of prices. A contrast of stabilized and nonstabilized prices is shown in Exhibit 5.

There are three common statistical measures of stability: the *frequency* of change in the price of an item, the *amplitude* of change (i.e., how high and low price swings), and the *timing* of price change (i.e., whether a given series leads or lags other series). It has also been suggested that the response of prices to cost is of basic importance in the study of price flexibility. For example, some industries are so organized that they tend to pass on rapidly, by means of price reductions, the benefits of cost reductions achieved through technologic advance; others are slow to do so.

Exhibit 5

SENSITIVE AND INSENSITIVE PRICES, 1926-39
(1926 = 100)



Source: *T.N.E.C. Monograph No. 1*, p. 24. These index numbers are based on averages of quotations secured as of one day each week.

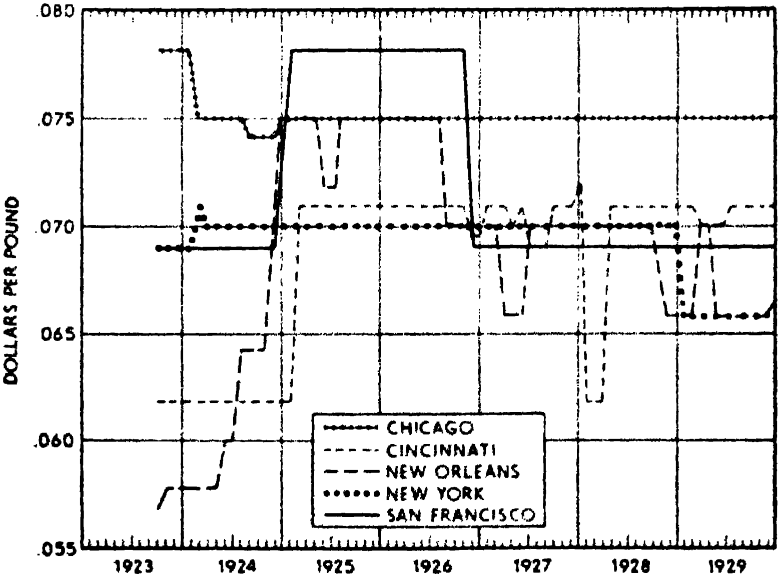
Burns traces the widespread desire, on the part of business companies, to stabilize prices to five causes:

1. The crude belief that higher prices always mean higher profits;
2. The fact that, with excess capacity and large overhead costs, price stabilization eliminates the danger of cutthroat competition;
3. The general belief that demand is inelastic and that one price cut may encourage buyers to wait for another reduction;
4. Uncertainty as to which price policy will be most profitable; and
5. The fact that price stabilization is a simple, readily understood policy.[17]

The market conditions which permit stabilization of prices are of many sorts. The fact that in many companies prices are set for a season, a model year, or other selling period increases stability. Similarly, some commodities, such as steel, are sold under long-term contracts, reducing the number of transactions. Others are sold with guarantees against price declines—a stabilizing factor. Prices are also likely to be stable in industries where trade associations are

Exhibit 6

WHOLESALE PRICES OF BREAD IN FIVE CITIES, OCTOBER, 1923, TO DECEMBER, 1929



Source: Arthur R. Burns, *Decline of Competition* (New York: McGraw-Hill Book Co., Inc., 1936), p. 234. Courtesy of publisher.

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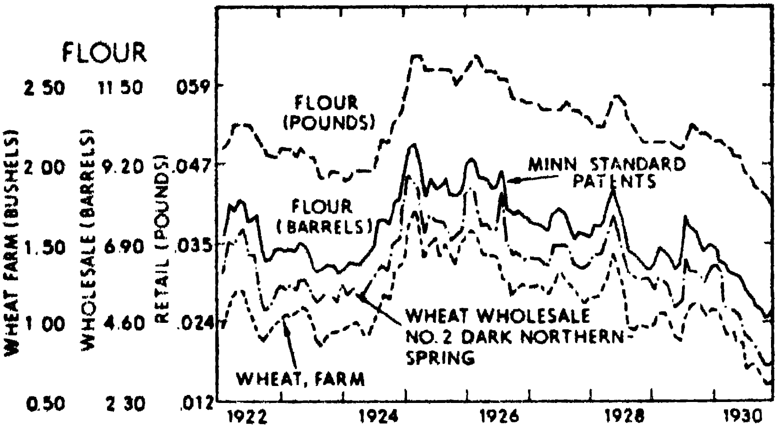
[17] *Ibid.*, p. 196.

Exhibit 7

PRICES OF WHEAT AND FLOUR, 1922–30



Source: Arthur R. Burns, *Decline of Competition* (New York: McGraw-Hill Book Co., Inc., 1936), p. 245. Courtesy of publisher.

strong or where the number of sellers is small. In the latter the existence of price leadership encourages stability of price.

The effect of different market structures on price stability is illustrated by a comparison of bread prices (Exhibit 6) with prices of wheat and flour, both wholesale and retail (Exhibit 7). The production of bread in large cities is frequently in the hands of a few large baking companies, with a fringe of smaller ones. The smaller firms tend to accept the prices set by the larger ones. In these markets, prices change infrequently: in Cincinnati, for example, the price of bread was fixed at 6.2 cents per pound during 1922, 1923, and 1924 and at 7.1 cents from February, 1925, until December, 1926. On the other hand, the prices of wheat and flour are determined by the actions of large numbers of buyers and sellers on well-organized markets. Prices for these commodities change frequently and by appreciable amounts. It will be noticed that the long decline of wheat prices after 1924 was not reflected in corresponding reductions in the price of bread.[18]

Price Cutting

A firm engages in price cutting when it reduces the price of an article below the level at which other firms are selling the same or similar goods. Strictly, any departure from a uniform market level would be regarded as price cutting under the terms of this definition. But it is customary in many industries and trades for different firms to preserve recognized differentials. Supermarkets, for example, usually sell the same goods at lower retail prices than do small service stores. These price differentials are part of the regular market structure and are not ordinarily considered price cuts.

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[18] *Ibid.*, pp. 234–35.

Business companies cut prices for several reasons. In the first place, price cutting, even under pure competition, is the method by which adjustments are made to changes in cost and demand. Someone must initiate the cut. Second, firms find a temporary advantage in price cutting as a way of securing a place in the market. Thus, a new retail store may reduce prices below the going level in order to build up a clientele. A third form of price cutting involves the use of leaders. The prices on one or a few items are cut in the hope of attracting sales, either for these or other items in the line. Finally, there is predatory price cutting which aims, by price reductions, to destroy the business of competitors. A related tactic in pricing is the disciplinary price cut invoked by a price leader to bring into line a smaller firm which has broken the established price.

Differential Pricing

In many business situations the price of a product is not a simple, unequivocal fact. In industrial pricing it is necessary to distinguish the *base price* from the *price structure*. The latter represents the system of differentials or departures from base price. In the steel industry, for example, there is a base price quoted for steel of a certain dimension. Added to the base price are *extras*, which apply to certain shapes and sizes of the product. In the same manner, steel of superior chemical composition calls for "quality extras." The relationship of base price to price structure varies greatly among industries. Frequently, the differentials in price are associated with differing quantities purchased, in which case they are called "quantity discounts." At other times the trade status of the buyer may give rise to different "trade discounts." Thus chains and mail-order houses may be given discounts off the base or list price which are different from those given wholesalers. (Under the Robinson-Patman Act preferential discounts may legally be granted only when based on difference in cost or when the effect is not materially to lessen competition.) Other differentials in the price structure may be introduced through cash discounts, freight allowances, seasonal discounts, advertising and promotional allowances, trade-ins, price guarantees, various credit terms, and discounts for early acceptance of delivery. The net price may also be effectively modified by use of guarantees of performance and quality, by extension of legal and other services, by agreements for exclusive dealerships, and in other ways which are not directly measurable in dollars and cents.

The importance of the distinction between base price and price structure is twofold: (1) there is a tendency for announced price variations to be made in terms of base price rather than in price structure, the latter remaining fixed for long periods of time, and (2) when prices soften, net prices to buyers will often be reduced by secret concessions within the price structure, base prices remaining unchanged. From the standpoint of management the distinction between base price and price structure is also important because it gives the firm additional means of adjusting its prices to the markets it serves.

The occasions for price differentials are numerous; many price structures are designed to provide prices not only for identical products sold under differing conditions or in differing amounts but for nonidentical products which are related in demand. Some of the pricing problems which give rise to price differentials have been classified by Professor Dean[19] as follows:

Type of Differential	*Example*
Quality differentials	Standard versus de luxe models Regular versus "fighting" brands
Size spreads	3-ton versus 5-ton trucks
Use differentials	Royalty leasing of patents and machinery Fluid milk versus cheese milk
Load-factor differentials	Morning movie prices Off-peak electric rates
Style cycle progressions	Merchandise mark-downs Fashion differentials
Trial discounts	Introductory subscriptions to magazines and to services
Quantity discounts	Order-size discounts Package-size differentials
Distribution channel differentials	Wholesale versus retail prices Private brand versus house brand
Geographical differentials	Zone pricing Basing-point pricing

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[19] Joel Dean, "Cost Forecasting and Price Policy," *Journal of Marketing*, Vol. XIII (January, 1949), p. 286.

The criteria for setting price differentials are based, as in the case of other price policies, on the characteristics of market structure. Dean discusses these as follows:

> *Product Line Pricing.* The problem is to fix the relationships of prices among your products. What kinds of products need to be priced in relationship? What kinds independently? In principle, only products whose demands are importantly interrelated must be considered together in pricing. Relationship on the cost side, through common production of distribution processes, has no bearing here. Common costs reduce the accuracy of estimates of the costs of individual products, but should not affect the relation of product prices. Joint products should be priced independently unless they are related in demand. Demand interdependence includes products that are similar in use and hence are potential fringe substitutes, or products that complement one another in use or in the sellers' market-strategy.
>
> A common way of setting the price of such kindred products is to estimate the full costs, including overheads, of each and apply a uniform percentage mark-up. This is easy and definite, but it is usually not the best way to go about it. The various qualities, sizes, editions etc., of the product are likely to tap market sectors differing in demand elasticity and in competitive intensity. These demand differences should be the controlling determination of price differences.
>
> A constructive approach to problems of this type is to view the product variants as opportunities for market segmentation in order to tap added markets and to separate sectors of the market which differ in demand elasticity. For example, multiple editions of books are a means of successively exploiting more and more elastic sectors of the market. Viewed thus the technical problem of product line pricing is to obtain the most profitable degree and kind of price discrimination.
>
> Relevant consideration for setting product differentials includes: (1) Relative buyer-benefits obtained from the product variants (*i.e.*, the use value in different applications and sections of the market). (2) Degree of competitive superiority of your product. (3) Intensity of competition. (4) Comparative elasticity of demand of the market segments tapped by each product. (5) Cross elasticity of demand among your products. (6) Future revenue consequences upon customer good-will. (Prices that are proportional to sellers' allocated costs are sometimes thought to have magical effects upon buyers' good-will.) (7) Promotional effects of introductory model pricing (e.g. loss leaders, introductory subscriptions, equipment subsidies to stimulate sales of parts). (8) Effects upon profits of alternative schedules of differentials best studied by effects on total contribution to overhead and profits.

From this list it is apparent that the role of cost estimates in product-line pricing should be a secondary one. Their most important job is to help project the earnings consequences of contemplated product differentials. Estimates of total cost before and after, paired with comparable estimates of total receipts, are needed for this job. The impacts upon total costs of more sales or of less sales of the various products can often be most practically projected by using the incremental cost of the various products.

Incremental cost has other important uses here. It can be used as a bench mark for finding the best pattern of market segmentation and price discrimination. The spread between incremental cost and price represents the product's contribution to overhead and profits. This spread should be studied in measuring the profit effects of alternative prices and in deciding upon product additions and product deletions. Hence *incremental costs play a strategic role in maximizing this marginal contribution by price structure decisions.*

Where common overhead costs are important, increment costs can often be approximated by using traceable costs. The allocation of overhead costs to individual products is quite arbitrary and is subject to wide errors; moreover many of the overhead items may not vary with output and hence have no short-run marginal cost. Orthodox allocations are often more misleading than useful in estimating incremental costs. This approach does not imply that prices should be *equal* to incremental costs —far from it. Nor does it mean that prices of related products should be *proportionate* to their marginal costs. The margin between price and incremental cost should normally differ among related products. And these differences should not be determined by the theology of cost accounting. Instead they should be governed by the demand and competitive considerations cited above. Thus, estimated incremental cost is a practical economic sill—it sets the minimum of bed rock pricings, it serves as a valid point of departure for demand pricing and provides an efficient vehicle for tracing effects on total costs and profits

Cost estimates sometimes have still another function in product price differentials. A study of the comparative costs of various kinds of users gives a clue to the use value and buyers' benefits of producers goods.

Royalty licensing represents in some respects a sort of ideal of market segmentation pricing that is keyed to user costs and user benefits and is admirably divorced from irrelevant sellers' costs.

Quantity Discounts. A sound quantity discount policy requires estimates of the relationship of your cost to the relevant dimensions of quantity. The Robinson-Patman Act is construed as limiting quantity discounts to the savings of the seller (although it makes an exception "to meet competition"). Key questions in studying this relationship include: Does cost vary more closely with account size (i.e. the volume of annual purchases), or with the size of the individual order? How big are the savings of case lots?

Many prewar cost analyses now badly distort the present and future cost relationships. The universality of the unprofitable small customer problem (e.g. 80 per cent of the customers accounting for 20 per cent of the volume and 10 per cent of the profits) may indicate that many

> quantity discount structures need a check-up. Possibly price has not been adequately used as an instrument of selective selling.
>
> Cost estimates should not *determine* the quantity discount structure; instead they should be used: (1) to help select the *basis* of discounts that is appropriate for your business (e.g. annual sales or order size); (2) to mark out legal limits for the amount of discounts; (3) to estimate the impact on your profits of adopting alternative schedules of quantity discounts."[29]

Economic theory treats market segmentation as a technical problem of price discrimination. Where it is possible to distinguish different classes of buyers within a total market and where these classes have different elasticities of demand, it is worth while for a seller to charge different prices for the same product. This assumes that there will not be an undue amount of transference of buyers or resale of product from the less-favored to the more-favored market. The wall of market segmentation can be built higher by differentiating what is basically the same product. The differentiation (e.g., through labeling, packaging, etc.) may or may not involve cost differences.

The legal meaning of price discrimination does not correspond at all points, however, to the economic concept. As represented in the Robinson-Patman Act, discriminatory prices are those which vary, for different buyers, by more than the costs involved in production and sale to these buyers. No legal discrimination is involved if the buyers are not in direct competition with one another.

SUGGESTED READINGS

The literature of price policy is enormous. It ranges from articles in the learned journals devoted to price theory, to case studies of particular markets. Many of these case studies make little effort to analyze the facts which they record. There is an increasing number of empirical studies, however, which employ the techniques of economic analysis. The following selections comprise some of the more useful works for the student of business economics.

ANDREWS, P. W. S. *Manufacturing Business*, chap. v, "Markets and Prices: Part I: The Sales Market." London: Macmillan & Co., Ltd., 1949. A pricing study based on the experience of Courtauld's and other British rayon producers. This is a very stimulating work, following in the empirical tradition of Hall and Hitch and of Saxton (*q.v.*). Andrews casts some doubt on the importance of differentiation of product as a factor in price policy.

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[29] *Ibid.*, pp. 286–88. Reproduced by permission.

Backman, Jules. "The Causes of Price Inflexibility," *Quarterly Journal of Economics*, Vol. LIV (May, 1940), pp. 474–89.

Bain, Joe S. "Market Classification in Modern Price Theory," *Quarterly Journal of Economics*, Vol. LVI (August, 1942), pp. 560–74. An attempt to extend the approach suggested by Mason (*q.v.*).

Bain, Joe S. *Pricing, Distribution, and Employment*, chaps. iv–viii. New York: Henry Holt & Co., Inc., 1948. A well-rounded study of both theoretical and empirical factors in pricing, for readers who are already familiar with the basic outlines of price theory.

Burns, Arthur Robert. *Decline of Competition*, chap. v. New York: McGraw-Hill Book Co., Inc., 1936. Discusses the nature of price stabilization, its causes, and consequences. Numerous illustrative examples.

Conference on Price Research. *Cost Behavior and Price Policy*. New York: National Bureau of Economic Research, 1943. Chap. xi, "The Implications of Cost Behavior for Price Analysis," relates cost factors to formation of price policy.

Dennison, H. S., and Galbraith, J. K. *Modern Competition and Business Policy*, chaps. i–iv. New York: Oxford University Press, 1938. A lucid, nontechnical explanation of industrial pricing policies.

Edwards, Corwin D. "Pricing Processes and Policies," *Annals of the American Academy of Political and Social Science*, Vol. CCIX (May, 1940), pp. 108–21. Emphasizes empirical aspects of pricing.

Eiteman, W. J. *Price Determination, Business Practice vs. Economic Theory*. Michigan Business Reports, No. 16. Ann Arbor: University of Michigan, 1949. Compares pricing practices with theoretic models and suggests alternative hypotheses to explain pricing.

Hall, R. L., and Hitch, C. J. "Price Theory and Business Behavior," *Oxford Economic Papers*, No. 2 (May, 1939), pp. 12–45. Sharply criticizes marginal theory and suggests full-cost pricing as an alternative theory of price formation based on business behavior. A provocative article which opened the so-called "marginalist" controversy in the economic journals. For other references see above, footnote 5, p. 235.

Hamilton, Walton (ed.). *Price and Price Policies*. New York: McGraw-Hill Book Co., Inc., 1938. Chapter i introduces a series of studies of price policy in several industries.

Mason, E. S. "Price Inflexibility," *Review of Economic Statistics*, Vol. XX (May, 1938), pp. 53–64. Discusses statistical, analytical, and normative meanings of price flexibility. The author finds no statistical evidence to support the claim that the price system is becoming more inflexible.

Mason, E. S. "Price and Production Policy of Large-Scale Enterprise," *American Economic Review*, Vol. XXIX, Supplement (March, 1939), pp 61–74. Suggests examination of internal organization of firm and market structures as a basis for price policy. A fundamental article.

Means, Gardiner. *Industrial Prices and Their Relative Inflexibility*. Senate Doc. No. 13 (74th Cong., 1st Sess.). Washington, D.C.: Government Printing Office, 1935. Points out correlation between inflexible prices and curtailment of output in periods of depression.

Meyers, Albert L. *Elements of Modern Economics*, chaps. x–xi. 3d. ed. New York: Prentice-Hall Book Co. Inc., 1948. Elementary treatment of price theory.

Neal, Alfred C. *Industrial Concentration and Price Inflexibility.* Washington: American Council on Public Affairs, 1942. Chapters v and vi discuss the relationship between price flexibility and changes in costs.

Nelson, Saul, and Keim, Walter G. *Price Behavior and Business Policy*, chap. i. *T.N.E.C. Monograph No. 1.* Washington, D.C.: Government Printing Office, 1940. Nontechnical explanation of price policy. Chapter ii, "Price Flexibility," is a good summary of facts and issues in this field.

Nourse, Edwin G. *Price Making in a Democracy.* Washington: Brookings Institution, 1944. Appendix A, "The Role of Price Policy in Business Management," emphasizes the key position of the businessman as a determinant of price policy.

Robinson, Joan. *The Economics of Imperfect Competition*, chap. iii. London: Macmillan & Co., Ltd., 1938. Geometrical presentation of price theory.

Samuelson, Paul A. *Economics*, chap. xxi. New York: McGraw-Hill Book Co., Inc., 1948. Elementary treatment of price theory.

Saxton, C. Clive. *The Economics of Price Determination.* [London]: Oxford University Press, 1942. An excellent study based on empirical data from questionnaires sent to businessmen. Along the lines of Hall and Hitch (above) but more extensive.

Stigler, George J. *The Theory of Price*, chaps. ix, xiv. New York: Macmillan Co., 1947. Formal presentation of price theory for pure competition and imperfect (monopolistic) competition.

Thorp, Willard L. "Price Theories and Market Realities," *American Economic Review*, Vol. XXVI, Supplement (March, 1936), pp. 15–22. Emphasizes empirical aspects of pricing.

Wilcox, Clair. *Competition and Monopoly. T.N.E.C. Monograph No. 21.* Washington, D.C.: Government Printing Office, 1940. Chapter i, "The Nature and Significance of Competition and Monopoly," presents a good, nontechnical discussion of market structures.

Price Agreements

Case IV-1: THE BITUMINOUS COAL INDUSTRY

In April, 1937, Congress passed the Bituminous Coal Act, which provided for industry-wide price fixing. The actual setting of prices was to be accomplished by joint action of a national Bituminous Coal Commission of seven members and twenty-three district boards located in each of the regions into which the industry had been divided for administration purposes. Price schedules covering each type, size, and quality of coal were established for each of ten minimum-price areas and were to yield a net return equal to the weighted average of total costs for each area.[1] The act also provided for a Bituminous Coal Code governing marketing practices, including pricing, and all producers were required by law to accept the code or to pay a tax of 19½ per cent of the sale price of coal not produced under the code.

The number of producers in the bituminous coal industry was large. In 1936 there were 6,875 mines producing more than a thousand tons a year,[2] but this figure failed to include a large number of small producers, such as truck and wagon mines, "snow birds," and "fly-by-nights." The 6,875 listed mines were operated by more than 4,000 separate companies, but the total number of operators was well in excess of this—11,500 having accepted the Bituminous Coal Code by November 15, 1938. Only a few hundred of the larger mines were "captive," i.e., owned by railroad, steel, or other industrial companies which consumed all or a large part of their output.[3] Most of the companies and most of the mines were small. In 1937, three-fifths of the mines produced less than 10,000 tons, three-quarters less than 50,000 tons, and nine-tenths less than 200,000 tons; only 3 per cent of them produced more than 500,000 tons. Although the bulk of the output came from larger mines—over a third of it came from the 3 per cent of mines that produced more than 500,000 tons each—even these were numerous, there being 212 mines in the top 3 per cent.[4] Moreover, there was no large degree of concentration of control of output in the hands of a few. In 1929 the forty-eight largest producers controlled only 43 per cent of the output. The largest producer controlled only about 3 per cent; the four largest between 8 and 10 per cent.[5]

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[1] Each minimum-price area consisted of from one to nine districts.

[2] *Minerals Yearbook*, 1938, p. 713.

[3] Captive mines, however, produced one-fifth of the total output. Cf. Fred E. Berquist and Associates, *Economic Survey of the Bituminous Coal Industry under Free Competition and Code Regulation* (N.R.A., Division of Review, Work Material No. 69, mimeo., 1936), p. 32. Quoted by Clair Wilcox, *Competition and Monopoly*, p. 25.

[4] Wilcox, *op. cit.*, p. 24.

[5] John P. Miller, "The Pricing of Bituminous Coal: Some International Comparisons," *Public Policy* (Yearbook of the Graduate School of Public Administration, Harvard University, 1940, ed. C. J. Friedrich and Edward S. Mason) (Cambridge, Mass.: Harvard University Press, 1940), pp. 145–46. Professor Miller's article offers an excellent discussion of the issues considered in this case.

The buyers of coal were, for the most part, large and well-informed. Railroads accounted for one-fifth to one-fourth of all purchases: utilities 10 per cent; and coking plants over 16 per cent (see Exhibit 1). Domestic consumers bought a relatively small part of the total output. As a result, rational buying motives predominated, and price played an important part in purchase negotiations.

In the period after 1923 there was a progressive shift from coal to other fuels. The extent of this substitution is shown in Exhibit 2.

Exhibit 1

CONSUMPTION OF BITUMINOUS COAL AND LIGNITE, BY CONSUMER CLASS, 1936

(In Thousands of Short Tons)

Consumer Class	Consumption	Per Cent of Total
Colliery fuel	3,227	0.7
Electric power utilities	40,029	9.8
Bunker, foreign trade	1,622	0.4
Railroads, Class I	86,391	20.9
Coke, beehive ovens	2,698	0.7
Coke, by-product ovens	63,244	15.4
Steel and rolling mills	13,471	3.2
Coal-gas retorts	1,945	0.5
Cement mills	4,771	1.1
Other industries	108,620	26.6
Retail dealer deliveries	84,200	20.7
Total	410,218	100.0

Source: *Statistical Abstract of the United States*, 1947, p. 754.

Declining demand for coal was attributed also to improved efficiency in the use of fuel.

In the short run there was little possibility for most industrial users to substitute other fuels, so short-run changes in the relationship between coal prices and those of other fuels did not materially affect the amount of coal demanded. Under these conditions, the amount of coal consumed depended principally on the rate of activity of the coal-using industries. Much of the demand, moreover, came from railroads, public utilities, steel, and other industries whose prices were relatively stable. For many industrial users the cost of coal was but a small part of their total costs.

The costs of distribution, which included transportation and middlemen's margins, were large in relation to the price of coal and were quite inflexible. A large percentage decline in the price of

Exhibit 2

CONSUMPTION OF BITUMINOUS COAL, COAL EQUIVALENT OF FUEL OIL AND NATURAL GAS, AND OUTPUT OF HYDROELECTRIC POWER REDUCED TO COAL EQUIVALENT, 1923–38

(Thousands of Net Tons)

Year	Bituminous Coal Consumed (Net Tons)	Per Cent of Total	Fuel Oil Consumed in Coal Equivalent (Net Tons)	Per Cent of Total	Natural Gas Consumed in Coal Equivalent (Net Tons)	Per Cent of Total	Output of Hydroelectric Power Reduced to Coal Equivalent on Basis Current Efficiency Rate for Steam Generation (Net Tons)	Per Cent of Total	Total
1923	518,063	81.5	66,509	10.5	27,740	4.4	23,212	3.6	636,544
1924	484,004	79.4	74,038	12.2	29,577	4.8	21,666	3.6	609,285
1925	499,193	78.1	85,287	13.3	31,227	4.9	23,474	3.7	639,181
1926	532,581	78.5	85,319	12.6	35,217	5.2	25,534	3.7	678,651
1927	499,801	76.5	88,450	13.5	37,585	5.8	27,185	4.2	653,021
1928	498,828	74.7	97,519	14.6	40,957	6.1	30,532	4.6	667,836
1929	519,555	74.3	102,403	14.7	47,563	6.8	29,262	4.2	698,783
1930	454,990	73.4	90,532	14.6	47,593	7.7	26,747	4.3	619,862
1931	371,869	70.8	83,667	15.9	45,874	8.8	23,717	4.5	525,127
1932	306,917	67.8	77,030	17.0	42,830	9.5	25,574	5.7	452,351
1933	321,617	68.5	79,066	16.8	43,908	9.3	25,244	5.4	469,835
1934	347,043	68.6	85,088	16.8	49,020	9.7	25,033	4.9	506,184
1935	360,292	67.3	91,681	17.1	54,305	10.2	29,177	5.4	535,455
1936	422,796	68.4	102,600	16.6	62,931	10.2	29,475	4.8	617,802
1937	428,406	66.9	110,580	17.3	70,532	11.0	31,028	4.8	640,546
1938	340,735	63.1	102,304	18.9	65,811	12.2	31,295	5.8	540,145
Total	6,907,710		1,422,290		732,478		428,735		9,491,180

Source: *T.N.E.C. Hearings*, Part 30, exhibit 2737, table 5. Reproduced in *T.N.E.C. Monograph No. 21*, p. 101.

coal at the mine caused a relatively small percentage decline in the price of coal at the point of consumption.

The cost structure of the industry reflected the great importance of labor costs, which accounted for almost 60 per cent of the total (see Exhibit 3). Because of the geographic isolation of many coal-mining communities, miners had few alternative employment opportunities; the supply of labor, therefore, was inelastic and did not vary much, in the short run, with changes in wage rates. In the absence of strong union organization prior to 1933, changes in price of the final product had a direct impact on wages. Other production costs were, like those for labor, largely out-of-pocket expenses to the mine operators.

The bituminous coal industry was one in which supply could be readily expanded. There was a large amount of underutilized capacity, partly attributable to seasonal and cyclical fluctuations of demand. Because storage of coal is expensive, fluctuations in demand were met largely by changes in the rate of production rather than by changes in inventories. It was customary to run mines with a full crew when they were in operation and to adjust the output of individual mines by varying the number of days worked per month. In 1923, with the industry at a high rate of output, the theoretical capacity was only 58 per cent in use; in 1929 only 71 per cent; in 1932 only 47 per cent; and in the years from 1934 through 1937 about 60 per cent.[6] New concerns entered the business easily. The supply of coal in the United States was widely distributed, and title to workable seams was held by thousands of owners. Much of the supply was so readily accessible that mines could be opened quickly and at small expense. Groups of miners who could command a small amount of capital, chiefly for trucks, were free to enter the field. A slight rise in prices would encourage operators to increase output of existing mines, to reopen abandoned mines, and to bring new areas into production.

Exhibit 3

MINING COSTS: APPALACHIAN REGION (DIVISION I), NOVEMBER, 1933

	Cost per Ton	Percentage of Total Cost
Mine labor	$0.93	59.0
Mine supplies	0.22	13.9
Other mine expenses	0.03	1.8
Royalties, dues, compensation insurance, and depletion	0.15	9.5
Depreciation, taxes, insurance	0.11	7.0
Sales and administration	0.14	8.8
Total	$1.58	100.0

Source: W. [illegible] [illegible] and [illegible] Bates, *The Bituminous Coal Industry with a Survey of Competing Fuels* (Washington: Federal Emergency Relief Administration, 1935), p. 73; quoted by [illegible], "The Pricing of Bituminous Coal: Some International Comparisons," *Public Policy* (Cambridge, Mass.: Harvard University Press, 1940), p. 148.

Although the industry was quick to expand, it was slow to contract. Describing this condition, one observer commented:

> Falling prices do not result in a proportionate reduction in the number of operators or the volume of output. A mine once opened cannot be closed without expense. It must be ventilated to prevent accumulation of dangerous gases, pumped to prevent flooding, and timbered to prevent the loss of working places. Maintenance of idle properties may be more costly than operations at a loss. Bankruptcy eliminates mining companies but does not affect their mines: new owners, with a lighter burden of

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[6] U.S. Department of the Interior, Bituminous Coal Division, *Bituminous Coal Tables, 1937–38*, p. 5; quoted by Wilcox, op. cit., p. 24.

> fixed charges, continue to produce. Enterprises that might otherwise have disappeared were kept alive during the twenties by the establishment of wage differentials in union contracts, a significant concession since labor constitutes two-thirds of the cost of mining coal. Producers who might otherwise have failed to reach the market have been enabled to do so by the inclusion of similar differentials in the structure of freight rates, another significant arrangement since the cost of transportation represents three fifths of the value of delivered coal. Although the price realized at the mine in 1929 was 52 per cent below that received in 1920, production was only 6 per cent below the level established in the earlier year.[7]

As a result of these conditions there was chronic long-term excess capacity in the industry.[8] Only by a slow process of attrition was capacity gradually reduced in the ten years following 1923 (see Exhibit 4 on page 261).

The history of the industry since World War I was one of almost steady recession of prices and wages. Market forces determined prices and output until, in 1933, the establishment of a code for the industry under the National Recovery Administration. Even before the N.R.A. was declared unconstitutional, the bituminous coal industry had come under the National Coal Conservation Act of 1935, which regulated prices and labor relations; but this, in turn, was declared unconstitutional.[9] Shortly thereafter Congress passed the Bituminous Coal Act of 1937, the pricing provisions of which were described in the opening paragraph of this case.

QUESTIONS

1. Analyze the conditions of supply and demand which, from the standpoint of the individual mine operator, made price agreement under the Bituminous Coal Act a desirable price policy.
2. Would price agreements be equally desirable from the standpoint of an individual producer in a competitive industry such as cotton textiles?
3. Is governmental sponsorship of price agreements socially desirable in the bituminous coal industry?

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[7] Wilcox, *op. cit.*, p. 23.

[8] "To characterize a market as having excess capacity means . . . that there is momentarily a greater willingness to supply product over a certain price range than there would be if time were allowed to make all equilibrium adjustments. There is excess capacity if the quantity of factors associated with the industry would have been less if present prospects of future demand and costs had been foreseen; or if in view of the present prospects fixed factors and labor show a desire and intent to withdraw from the industry with the passage of time" (Miller, *op. cit.*, p. 151).

[9] *Carter* v. *Carter Coal* Co., 298 U.S. 238 (1936).

Exhibit 4

PRODUCTION, PRICES, CAPACITY, AND MINERS' WAGES, BITUMINOUS COAL INDUSTRY, 1920–40

(1) Year	(2) Production (Thousands of Short Tons)	(3) Av. Value per Ton at Mines*	(4) No. Mines	(5) Av. No. Men Employed	(6) Capacity of Mines† (Million Tons)	(7) Av. Spot Price per Ton	(8) Miners' Weekly Wages
1920	568,667	$3.75	8,907	639,547	798	$5.64	‡
1921	415,922	2.89	8,038	663,754	860	2.55	‡
1922	422,268	3.02	9,299	687,958	917	3.64	‡
1923	564,565	2.68	9,331	705,000	970	2.77	$25.60
1924	483,687	2.20	7,586	619,604	871	2.08	23.59
1925	520,053	2.04	7,144	588,493	823	2.06	26.47
1926	573,367	2.06	7,177	593,647	821	2.21	28.63
1927	517,763	1.99	7,011	593,918	835	1.99	24.33
1928	500,745	1.86	6,450	522,150	760	1.80	24.66
1929	534,989	1.78	6,057	503,000	752	1.79	25.72
1930	467,526	1.70	5,891	493,202	770	1.75	22.21
1931	382,089	1.54	5,642	450,213	736	‡	17.69
1932	309,710	1.31	5,427	406,000	653	‡	13.91
1933	333,631	1.34	5,555	418,703	615	‡	14.47
1934	359,368	1.75	6,258	458,011	622	‡	18.10
1935	372,373	1.77	6,315	462,403	640	2.04	19.58
1936	439,088	1.76	6,875	477,204	680	‡	22.71
1937	445,531	1.94	6,548	491,864	710	2.10	23.84
1938	348,545	1.95	5,777	441,333	663	2.04	20.80
1939	394,855	1.85	5,820	421,788	676	2.02	23.88
1940	460,772	1.91	6,324	439,075	703	‡	24.71

* Average value per ton less selling expenses (Bureau of Mines series) prior to 1937; thereafter, average gross realization including selling expense (Bituminous Coal Division series).

† Calculated at 308 working days per annum.

‡ Not available.

Source: Col. (2): *Statistical Abstract of the United States*; cols. (3)–(7), *Mineral Resources of the U.S.* (1920–30), *Minerals Yearbook* (1931–40); col. (8): *Historical Statistics of the United States 1789–1945* (U.S. Dept. of Commerce, Bureau of the Census).

Price Leadership

Case IV–2: THE BERYLLIUM ALLOY INDUSTRY[1]

On May 9, 1939, Mr. H. L. Randall, president of the Riverside Metal Company, of Riverside, New Jersey, submitted the following statement of price policies to the Temporary National Economic Committee:

> The price schedules issued by the Riverside Metal Company are contingent upon the prices published by the larger units of the industry. From time to time these larger units publish their scale of prices, and our company has no alternative except to meet such published prices in order to compete.

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[1] Material for this case was derived largely from the *T.N.E.C. Hearings*, Part 5 (76th Cong., 1st Sess.) Washington, D.C., Government Printing Office, 1939).

Beryllium is an element which can be combined with copper, nickel, and certain other metals to produce alloys which possess great qualities of hardness, lightness, and strength. The principal industrial form in which this metal is used is in the alloy beryllium copper, which consists of about 2 per cent beryllium and 98 per cent copper. The chief advantages of beryllium copper are the combination of extraordinary high-fatigue properties with good electrical conductivity. Beryllium alloys have many industrial uses, such as parts for electric motors, telephone instruments, diamond drills, and airplanes. Altimeters used in airplanes have beryllium copper diaphragms because these are more sensitive than other materials. Beryllium alloys are also used in bushings on machine parts.

Beryllium metal is derived from beryl oxide-bearing ores, which are refined by a relatively simple process. For technical reasons refiners sell beryllium in the form of a master-alloy, which contains 3½-5 per cent beryllium, with the remainder copper. Fabricators melt the master-alloy and add copper to bring the final beryllium copper alloy to the desired weight, frequently 2 per cent in beryllium content.

In 1939 beryllium master-alloy was being produced from ore by two principal companies, the Beryllium Corporation of Reading, Pennsylvania, and the Brush Beryllium Company, of Cleveland, Ohio. These companies also fabricated the master-alloy into sheets, strips, castings, and other products. Both companies sold master-alloy to fabricators of beryllium alloy products. The largest of these fabricators was the American Brass Company, of Waterbury, Connecticut. The Riverside Metal Company was one of the smallest fabricating firms in the beryllium alloy industry.

The following testimony from the *Hearings* of the Temporary National Economic Committee[3] describes some aspects of price policies used in the industry:

> MR. COX: You are the president of the Riverside Brass Co.?
>
> MR. RANDALL: Riverside Metal Co.
>
> MR. COX: What is the business of that company?
>
> MR. RANDALL: The business of the Riverside Metal Co. is the fabrication of nonferrous alloys into rod, wire, sheet, and strip. We supply the manufacturer with a raw product.
>
> MR. COX: You buy the master alloy and fabricate the material?
>
> MR. RANDALL: That is correct.

. . . .

---

[3] *Ibid.*, pp. 2084 ff.

We make nickel silvers, phosphor bronzes, some brass; I think altogether we have an alloy list of over 80 different alloys.

MR. COX: Are all of the alloys which your company makes alloys which are also made and sold by The American Brass Co.?

MR. RANDALL: I think that would be true.

MR. COX: How large a company is your company? Will you give us your capitalization?

MR. RANDALL: Our capitalization is one and a half million dollars, and we are almost the smallest unit in the industry, there may be one or two smaller, but I think we are almost the smallest.

MR. COX: Can you give us any approximate figure to indicate what percentage of the industry your company controls?

MR. RANDALL: Less than one and a half per cent.

. . . .

MR. COX: From whom do you buy the master alloys?

MR. RANDALL: We buy the master alloys from the Beryllium Products Corporation.

MR. COX: That is Mr. Gahagan?

MR. RANDALL: Mr. Gahagan.

MR. COX: Have you always bought all of your master alloy from that company?

MR. RANDALL. Practically all, yes.

. . . .

MR. COX: Mr. Randall, would it be correct to say that there is a well crystallized practice of price leadership in the industry in which you are engaged?

MR. RANDALL: I would say so.

MR. COX: And what company is the price leader?

MR. RANDALL: I would say The American Brass Co. holds that position.

MR. COX: And your company follows the prices which are announced by The American Brass?

MR. RANDALL. That is correct.

MR. COX: So that when they reduce the price you have to reduce it, too. Is that correct?

MR. RANDALL: Well, we don't have to, but we do.

MR. COX: And when they raise the price you raise the price.

MR. RANDALL: That is correct.

MR. COX: Do you remember that in February 1937, Mr. Gahagan's company reduced the price of the master alloy from $30 to $23 a pound?

MR. RANDALL: I didn't know it at that time.

MR. COX: You did know there was a price decrease

MR. RANDALL: I do now.

MR. COX: Weren't you buying any from Mr. Gahagan?

MR. RANDALL: I think we were buying from them but it was quite some time after that I got the information that the price had gone down.

MR. COX: After that decrease in the price of the master alloy, it is a fact, isn't it, that there was no decrease in price of the fabricated product which you made?

MR. RANDALL: I don't remember about that. I don't know, because I don't know when that decrease took place.

MR. COX: Looking at your sheet prices for the year 1937, you started at $1.01 a pound on January 14, 1937, and rose progressively until you reached $1.06 on March 31, and then on April 6, 1937, they dropped to $1.05. You remember those.

MR. RANDALL: Yes; I remember those. That was copper.

. . . .

MR. COX: But you do know there was about that time a decrease of $7 a pound in the price which you were paying to Mr. Gahagan.

MR. RANDALL: Yes, I do know that.

MR. COX: I will put this question to you, Mr. Randall. Why didn't you reduce the price of the fabricated product following that decrease in the price of the master alloy?

MR. RANDALL: Well, of course I would not make a reduction in the

Exhibit I

BERYLLIUM COPPER BASE PRICES, 1935–39

Riverside Metal Co.				American Brass Co.			
Date	Sheet	Wire	Rods	Date	Sheet	Wire	Rods
Feb. 25, 1935	0.97	1.25	0.97	Feb. 6, 1935	0.97	1.25	0.97
June 28, 1935	0.96	1.24	0.96	June 27, 1935	0.96	1.24	0.96
Aug. 22, 1935	0.96½	1.24½	0.96½	Aug. 20, 1935	0.96½	1.24½	0.96½
Sept. 19, 1935	0.97	1.25	0.97	Sept. 17, 1935	0.97	1.25	0.97
Oct. 27, 1936	0.98	1.26	0.98	Oct. 27, 1936	0.98	1.26	0.98
Nov. 7, 1936	0.98½	1.26½	0.98½	Nov. 7, 1936	0.98½	1.26½	0.98½
Dec. 15, 1936	0.99	1.27	0.99	Dec. 15, 1936	0.99	1.27	0.99
Dec. 31, 1936	1.00	1.28	1.00	Dec. 31, 1936	1.00	1.28	1.00
Jan. 14, 1937	1.01	1.29	1.00	Jan. 14, 1937	1.01	1.29	1.01
Feb. 16, 1937	1.02	1.30	1.02	Feb. 16, 1937	1.02	1.30	1.02
Feb. 22, 1937	1.03	1.31	1.03	Feb. 22, 1937	1.03	1.31	1.03
Mar. 8, 1937	1.05	1.33	1.05	Mar. 8, 1937	1.05	1.33	1.05
Mar. 31, 1937	1.06	1.34	1.06	Mar. 31, 1937	1.06	1.34	1.06
Apr. 6, 1937	1.05	1.33	1.05	Apr. 6, 1937	1.05	1.33	1.05
Apr. 20, 1937	1.04	1.32	1.04	Apr. 20, 1937	1.04	1.32	1.04
Oct. 26, 1937	1.03	1.31	1.03	Oct. 26, 1937	1.03	1.31	1.03
Nov. 23, 1937	1.02	1.30	1.02	Nov. 23, 1937	1.02	1.30	1.02
Jan. 20, 1938	1.12	1.30	1.12	Jan. 20, 1938	1.12	1.30	1.12
Jan. 28, 1938	1.11½	1.29½	1.11½	Jan. 28, 1938	1.11½	1.29½	1.11½
May 20, 1938	1.10½	1.28½	1.10½	May 20, 1938	1.10½	1.28½	1.10½
July 5, 1938	1.11	1.29	1.11	July 5, 1938	1.11	1.29	1.11
July 25, 1938	1.11¼	1.29¼	1.11¼	July 25, 1938	1.11¼	1.29¼	1.11¼
Sept. 19, 1938	1.11½	1.29½	1.11½	Sept. 19, 1938	1.11½	1.29½	1.11½
Oct. 10, 1938	1.11⅞	1.29⅞	1.11⅞	Oct. 10, 1938	1.11⅞	1.29⅞	1.11⅞
Oct. 13, 1938	1.12	1.30	1.12	Oct. 13, 1938	1.12	1.30	1.12
Apr. 20, 1939	1.11	1.29	1.11	Apr. 20, 1939	1.11	1.29	1.11

Source: *T.N.E.C., Hearings*, Part 5, 76th Cong., 1st Sess. (Washington, D.C.: Government Printing Office, 1939), pp. 2264, 2287–88.

base price of beryllium copper unless The American Brass made a price reduction in beryllium copper.

Mr. Cox: And the American Brass Co. made no reduction at that time?

Mr. Randall: If they did, we did, as indicated on that sheet.

Mr. Cox: Assuming you didn't make a price change then, the reason you didn't was because The American Brass Co. didn't.

Mr. Randall: That is correct.

Mr. Arnold: You exercise no individual judgment as to the price you charged for your product, then, in a situation?

Mr. Randall: Well, I think that is about what it amounts to; yes, sir.

Mr. Arnold: When you say you have to follow, you don't mean anybody told you you had to follow?

Mr. Randall: No sir; I don't mean that at all.

Mr. Arnold: But you have a feeling something might happen if you didn't?

Mr. Randall: I don't know what would happen.

Mr. Cox: You don't want to find out, do you?

The Chairman. Well, as a matter of fact, Mr. Randall, if The American Brass Co. raised the price would the Brass Co. consult you about raising it?

Mr. Randall: No, sir; not at all.

The Chairman: You would, however, follow them without exercising any independent judgment as to whether or not it was desirable.

Mr. Randall: That is correct.

The Chairman: Suppose The American Brass Co. raises its price, but you are satisfied with your output and with the profit that you are making at the old price. Why is it necessary for you to increase your price to your customers, who are already paying you a price sufficient to give you a profit that is satisfactory to you.

Mr. Randall: I don't know that it is necessary; as a practical matter, if we didn't raise our prices with The American Brass Co. or other companies, whoever it might be, would put their price back to where it was.

Mr. Chairman: That wouldn't bother you, because you were making a profit at the old price.

Mr. Randall: Not on beryllium copper.

The Chairman: Why do you do it?

Mr. Randall: It is the custom of the industry, at least of the smaller companies, to do that.

The Chairman: And other small companies do the same thing?

Mr. Randall: Yes, sir.

The Chairman: Is there any reason outside of custom for it?

Mr. Randall: No, sir.

The Chairman: Isn't it likely to reduce the amount of business that you can obtain?

Mr. Randall: I don't think so.

The Chairman: Well, if a competitor raises the price for an identical product, isn't it likely to believe that the producer who does not raise the price would get more business?

Mr. Randall: I imagine it would, if the other price stayed where it had been raised to. I think that might work out over a period of time.

The Chairman: You see, I am trying to get some understanding of the exact reasons why this price policy is followed, and it is not an answer—understand me, I am not criticizing your answer—that carries conviction merely to say it is the custom of the industry. There is a reason for customs. What, in your opinion, is the reason for this custom to follow the leader?

Mr. Randall: Well, of course, that is a custom which has been prevalent, I think, in the industry for many, many years prior to my entry into it

The Chairman: Oh, yes; we hear a lot about price leadership, but I am trying to get the picture of this practice as you see it, and why you follow it.

Mr. Randall: Well, I don't think I have ever given the matter very much consideration. We simply, when the new prices come out, print them just as they are. We don't give the matter any consideration. The prices are published and we print those prices

The Chairman: Is there any sort of compulsion, moral or otherwise?

Mr. Randall: Absolutely none.

The Chairman: Do you think it is a good practice?

Mr. Randall: Well, I have never given the subject very much consideration.

The Chairman: Now, of course, it is one of the most important subjects in your business.

Mr. Randall: Yes; it is, of course

The Chairman: The price that you get for your product.

Mr. Randall: I can't answer that question. I don't know whether it is a good practice or whether it isn't a good practice. I know that it has been the custom of the industry for years on end, and I know that is what we do, that's all.

The Chairman: A moment ago, in response to either Mr. Cox's question or my question, you answered that if you did not follow the price up, then The American Brass Co. or some other company would come down again.

Mr. Randall: I don't think I said they would. I said they probably would or they might. I don't know what they would do.

Mr. Chairman: Then I made the comment that that would not be a disturbing result, because it would mean merely the restoration of the old price. I could imagine, however, that you might start a price war, and that the other companies might go below you. Is there a possibility that that is what you have in mind?

Mr Randall: I didn't have it in mind until this moment. That is a possibility; yes.

The Chairman: So you want the committee to understand that so far as you and your company are concerned, this price-leadership question is one to which you have never given any real consideration, and you have boosted your prices along with The American Brass Co. just as a matter of custom?

Mr. Randall: Yes.

. . . .

Mr. Arnold: . . . but if this policy is continued, you will continue to follow The American Brass regardless of what your costs are, won't you, so that won't be an element in the picture?

Mr. Randall: Of course to be perfectly frank, on that subject we don't know what our costs are on beryllium.

Mr. Arnold: It wouldn't make any difference if you did, so far as the present prices are concerned, would it?

Mr. Randall: No, sir; I don't think it would.

Mr. Arnold: In other words, there is a situation here where there is a lot of competitors and no competition.

Mr. Randall: Well, we simply, as I said before, follow the prices that are published, and that is what we have been doing for a good many years.

. . . .

At the conclusion of Mr. Randall's testimony, Mr. John A. Coe, Jr., general sales manager of the American Brass Company, was called to the stand. His testimony follows:

Mr. Cox: What is the nature of the business of The American Brass Co.?

Mr. Coe: The American Brass Co. is engaged in the production of copper, brass, bronze, and nickel silver in wrought forms, including sheet, wire, rods and tubes and other fabricated forms.

Mr. Cox: What is the capitalization of the company?

Mr. Coe: The American Brass Co. is a wholly owned fabricating subsidiary of the Anaconda Copper Mining Co.

Mr. Cox: Can you tell us what the capitalization of the company is?

Mr. Coe: I do not know what it is

Mr. Cox: You heard Mr. Randall testify that his company did less than 1½ per cent of the business in which he was engaged. Can you give us any approximate figure as to the percentage of the business which your company does.

Mr. Coe: Approximately 25 per cent.

. . . .

Mr. Cox: You heard Mr. Randall's testimony with respect to the system of price leadership which prevails.

Mr. Coe: Yes.

Mr. Cox: Would you agree with his description of that system insofar as it denoted your company as the price leader?

Mr. Coe: I would not agree with that statement.

Mr. Cox: You wouldn't agree with the statement?

Mr. Coe: No.

Mr. Cox: In other words, it is your position that your company is not the price leader in the industry?

Mr. Coe: We are not the price leader of the industry.

Mr. Cox: It is a fact, is it not, that your prices for beryllium copper have been substantially the same as those of Mr. Randall for a period between 1934 and the present time?

Mr. Coe: So far as I know, they have been practically the same.

Mr. Cox: Practically the same prices. Now, you say you are not the price leader. Is there any price leader in the industry?

Mr. Coe: There is none.

Mr. Cox: Then how do you explain the fact that the prices are the same?

Mr. Coe: We publish our prices; they are public information; anybody who wishes to, may follow those prices at his own discretion.

Mr. Arnold: They all wish to apparently, don't they?

Mr. Coe: They do not, sir.

Mr. Arnold: You mean they have not been following those prices?

Mr. Coe: On our product they have not, sir.

Mr. Arnold: I got the impression, I may be wrong, that the prices of competitors and your prices have been substantially identical.

Mr. Coe: To some extent they have been identical. There are always variations in many prices.

Mr. Arnold: You said that anyone who wished to might follow. Some of them certainly wish to.

Mr. Coe: Some of them do wish to.

Mr. Arnold: And some of them did follow.

Mr. Coe: That is correct.

Mr. Arnold: And therefore to that extent you have been the leader.

Mr. Coe: To some extent we have been the leader in that we have put out our prices. However, others have put out prices and we have followed them at times.

Mr. Arnold: What other companies would you put in the position of price leadership aside from your own?

Mr. Coe: Practically any member of the industry.

Mr. Cox: Including Mr. Randall?

Mr. Coe: Including Mr. Randall.

. . . .

Mr. Arnold: I take it that the prices are fixed generally by someone following someone else, and that sometimes they follow you and other times you follow others.

Mr. Coe: May I ask what you mean by "fixed"? We publish our prices; they become our prices; they are public information. In that way the prices of The American Brass Co. are fixed by us.

Mr. Arnold: Then you understand what we mean by "fixed" and I repeat my question: Is is true that prices are fixed in this industry either by someone following you or by your following others?

Mr. Coe: Not in all respects. Many times we do not follow others in all respects; many times they do not follow us in all respects.

Mr. Arnold: But there is a following on the part of the various companies in the industry?

Mr. Coe: A general following; yes, sir.

The Chairman: Not that you impose your idea as to what the price should be upon anybody else, or that anybody else imposes it upon you, but when any company makes a change in price, the tendency is for all to follow that change?

Mr. Coe: That is the tendency.

The Chairman: And how long has that been the system?

Mr. Coe: As far back as I have been with the company that has been in vogue; water seeking its own level.

. . . .

The Chairman: What factors go into the determination of the price?

Mr. Coe: The cost of our raw metals going into the alloys, plus our manufacturing differentials. The latter is determined by our price committee.

The Chairman: And if the price of the raw material should go down, then one would naturally expect the price of the finished product to go down, unless there was some countervailing change in some other factor?

Mr. Coe: There are other factors to be taken into consideration; yes, sir.

Mr. Chairman: Well, now, would you say that the price fluctuates in the same degree that the price of these countervailing or these other factors fluctuate?

Mr. Coe: That is a difficult question to answer. I don't quite know what you mean by that.

The Chairman: Well, I tried to make it simple. The price of the finished product would naturally, one would suppose, depend upon the cost of the various factors which go into making the finished product?

Mr. Coe: That is correct.

The Chairman: Well, now, do you want the committee to understand that always the price of the finished product is determined by these other factors and by no other consideration?

Mr. Coe: The price is determined by the price of raw materials going into those products, plus our cost of manufacturing.

The Chairman: Yes; those are the other factors?

Mr. Coe: Those are the other factors.

The Chairman: And there is no other consideration that goes into the determination of the price?

Mr. Coe: That is correct.

The Chairman: And how about this leadership, why do you follow somebody else's lead sometimes?

Mr. Coe: We can get no more for our product than other people can get for theirs; will charge for theirs.

THE CHAIRMAN: Here is another outfit which is supposedly competing with you, which is not as efficient as you are, and therefore which finds for example that there is a much heavier plant charge, let us say; therefore, it is not able to produce this finished product at as low a price as you, and because it doesn't produce it at as low a price as you, it has to raise the price, but according to your testimony when such a company raises the price, then you follow and raise your price, although your costs have not changed.

MR. COE: We have not necessarily raised our price.

THE CHAIRMAN: Oh, now, let's drop the word "necessarily." You have just said that you have done that and that other companies follow you occasionally. Now, Mr. Coe, we are merely trying to get the facts here; we are not laying the basis for a case against the American Brass Co. I am trying to get through my mind this picture of price leadership in industry.

Now, you have told us as explicitly as it can be told that in some cases other companies in the same business as you follow the price that you fix, and you have told us how you determine that price, and then you say in other instances you followed the price of other companies, and when you do that necessarily you do it upon factors that are not reflected in your business, but on factors that are reflected in the business of the company which raises the price. Now why do you do it?

MR. COE: We can get as much for our product as any competitor can get for his product.

THE CHAIRMAN: Now we are getting somewhere. If some other company raises the price and is getting that price, then you think you had better come up and equalize it?

MR. COE: I feel that our product is as good as any made by the industry.

THE CHAIRMAN: It may be better.

MR. COE: I hope it is.

THE CHAIRMAN: But the point in determining the price thing is that you base it not upon the actual costs of manufacture in your plant, but upon the highest charge that anybody in the industry makes by and large, isn't that the effect of this price leadership policy?

MR. COE: It is usually predicated on the lowest price that anybody makes.

THE CHAIRMAN: Well, of course, there was an old familiar saying that the price the companies charge is what the traffic will bear. Now isn't that the motto which guides those who follow the practice of price leadership?

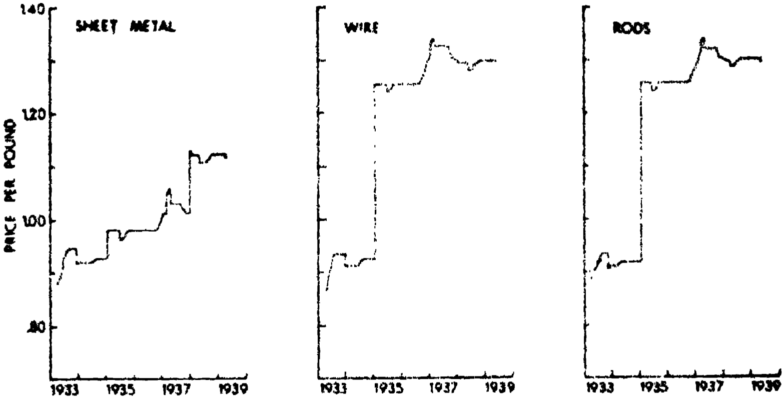
MR. COE: It depends on what you mean by "traffic." Of course we have to compete with many other things besides brass and copper.

THE CHAIRMAN: Well, would you say The American Brass Co. puts its product out at the lowest possible price, bearing in mind all of these factors of cost?

MR. COE: It is necessary when we get our products to the ultimate

Exhibit 2

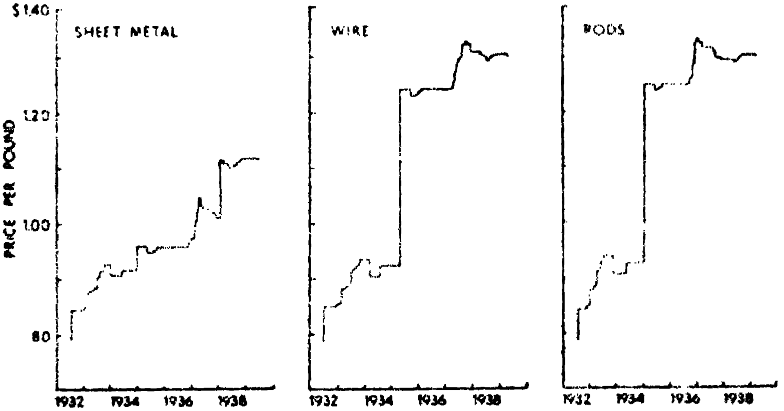
PRICES OF BERYLLIUM COPPER PRODUCTS, RIVERSIDE METAL CO., 1933–39



Source: *T.N.E.C. Hearings*, Part 5 (76th Cong. 1st Sess.) (Washington, D.C., Government Printing Office, 1939), p. 2285

Exhibit 3

PRICES OF BERYLLIUM COPPER PRODUCTS, AMERICAN BRASS CO., 1932–39



Source: *T.N.E.C. Hearings*, Part 5 (76th Cong. 1st Sess.) (Washington, D.C.: Government Printing Office, 1939), p. 2289.

consumer as low as we reasonably can, and still at a fair margin of profit, in order that we will not be—that our products will not be supplanted by substitutes.

The Chairman: But under this plan of price leadership, is it not inevitable that the tendency would be to raise the price so as to cover the cost of the less efficient member of the industry?

MR. COE: The tendency has been just the opposite. The tendency has been to lower the price.

QUESTIONS

1. Was the price policy of the Riverside Metal Company based on sound economic reasoning?
2. What was the effect of changes in raw-material prices on the prices set by the Riverside Metal Company?
3. What were the chief factors influencing the price policy of the American Brass Company? What effect had changes in prices of raw materials and other cost factors on the prices set by this company?

Basing-Point Pricing

Case IV-3: THE STEEL INDUSTRY

In April, 1948, the United States Supreme Court declared the basing-point system of pricing in the cement industry to be a form of unfair competition and therefore illegal.[1] Shortly thereafter the steel industry abandoned the basing-point method of pricing, which it had followed for over half a century, and adopted a system of uniform f.o.b. mill pricing. Under the latter system each seller quoted the same price to every potential or actual buyer at the seller's mill.

The basing-point system, as it had been applied in the steel industry, permitted sale only at the delivered price. This was calculated by adopting as a base price that at the basing point nearest the buyer. To this amount was added rail freight from the basing point to the place of actual delivery. This method of calculating delivered prices is shown in Exhibit 1. As the system developed prior to 1924, there was only one basing point for all steel products —Pittsburgh. Under the "Pittsburgh plus" practice, mills all over the United States calculated prices, not by reference to their own costs and shipping charges, but by reference to the single set of basing-point prices at Pittsburgh, plus rail freight from Pittsburgh to the buyer's location. When, in 1924, the Federal Trade Commission ordered certain subsidiaries of the United States Steel Corporation to "cease and desist" from this practice, the industry changed to a multiple basing-point system, in which several basing points were established for each product. With more than one basing point

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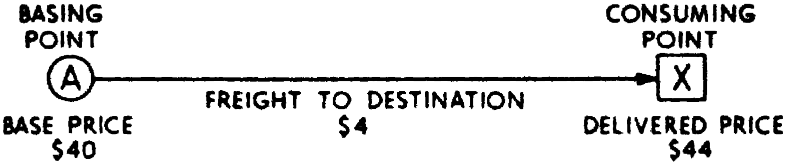
[1] *F.T.C. v. The Cement Institute* 333 U.S. 683 (1948).

Exhibit 1

THE BASING-POINT METHOD: HOW THE DELIVERED PRICE IS COMPUTED

(Most Steel Products Are Sold on a Delivered-Price Basis)



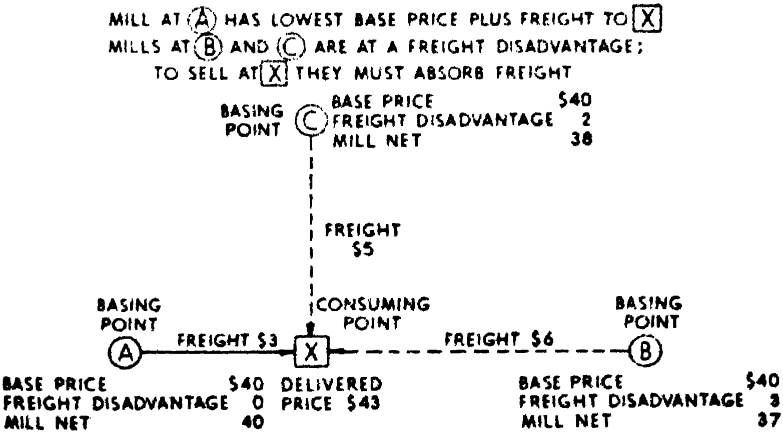
Source: United States Steel Corporation, *T.N.E.C. Papers* (New York, 1940), Vol. III, p. 2.

in existence, it became necessary for mills to calculate delivered prices by figuring rail freight from the *applicable* basing point. This was done by calculating the lowest combination of base price and freight for any given buyer.

With common delivered prices quoted to any given buyer, mills closer to the buyer gained an advantage over mills at a distance. Nonetheless, the more distant mills, by absorbing freight charges, still sold at the same delivered prices as those offered by the closer mills. The effect of freight absorption is illustrated in Exhibit 2. By

Exhibit 2

THE BASING-POINT METHOD: EXPLANATION OF FREIGHT DISADVANTAGE AND FREIGHT ABSORPTION



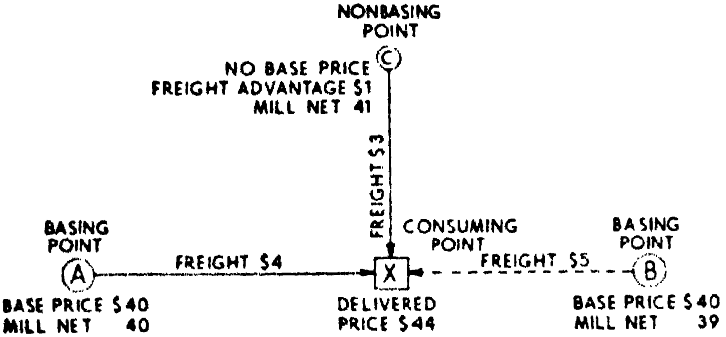
Source: United States Steel Corporation, *T.N.E.C. Papers* (New York, 1940), Vol. III, p. 2.

absorbing freight, mills found it possible to penetrate the "natural" market territory of other mills. Under some circumstances, where the seller was not located at a basing point, the delivered price was higher than the combination of base price and actual freight. Exhibit 3 indicates how "phantom freight" could arise. Phantom freight also arose in some cases from the use by the seller of cheaper means of transportation than rail freight, on which delivered prices were calculated[2] (see Exhibit 4). As a result of freight absorption on some sales and the realization of phantom freight on others, steel mills experienced varying mill net prices after deduction of actual transportation costs from the delivered prices at which products were sold.

Exhibit 3

THE BASING-POINT METHOD: EXPLANATION OF FIRST TYPE OF FREIGHT ADVANTAGE AND SO-CALLED "PHANTOM FREIGHT"

MILL AT Ⓐ HAS LOWEST BASE PRICE PLUS FREIGHT TO X
MILL AT Ⓒ CHARGES THE SAME DELIVERED PRICE HAVING A FREIGHT ADVANTAGE OF $1 OVER Ⓐ, Ⓒ REALIZES A MILL NET $1 HIGHER THAN Ⓐ. THIS $1 IS SO-CALLED "PHANTOM FREIGHT"



Source: United States Steel Corporation, *T.N.E.C. Papers* (New York, 1940), Vol. III, p. 6

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[2] There were, however, some circumstances when other forms of transportation, such as water shipment, were not more advantageous because: (1) a barge shipment had to be much larger than a rail shipment before it could be carried economically; (2) water transport was much slower than rail, (3) handling facilities for water shipment might be lacking; (4) extra handling costs were usually incurred both at the mill and at destination; and (5) seasonal closure of navigation limited the availability of water transport.

Exhibit 4

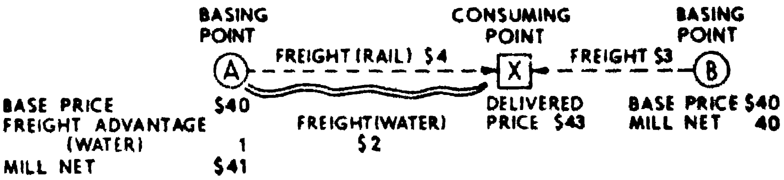
THE BASING-POINT METHOD: EXPLANATION ON SECOND TYPE OF FREIGHT ADVANTAGE AND SO-CALLED "PHANTOM FREIGHT"

MILL AT Ⓑ HAS LOWEST BASE PRICE PLUS RAIL FREIGHT TO $\boxed{X}$

MILL AT Ⓐ CHARGES THE SAME DELIVERED PRICE

WHEN MILL AT Ⓐ SHIPS BY WATER, IT HAS A FREIGHT ADVANTAGE OF $1 AND REALIZES A MILL NET $1 ABOVE ITS BASE PRICE

THIS $1 IS SO-CALLED "PHANTOM FREIGHT"



NOTE: WHEN MILL A Ⓐ SHIPS BY RAIL, IT IS AT A FREIGHT DISADVANTAGE OF $1 AND REALIZES A MILL NET $1 BELOW ITS BASE PRICE

Source: United States Steel Corporation, *T.N.E.C. Papers* (New York, 1940), Vol. III, p. 8.

Critics of the basing-point system asserted that it rested on agreement among members of the industry.

The basing point system of pricing steel comprises the following features: (1) leadership by United States Steel in announcing the base prices of standard products and adoption of its announcements by the other firms, (2) agreement upon the extras that are to be charged and the deductions that are to be allowed for variations in size and quality in the pricing of nonstandard products, (3) refusal by all sellers to quote prices on any but a delivered basis or to ship steel to any place other than the one where it is to be used, (4) agreement, in the case of each product, as to the cities that are to be employed as basing points, each seller, wherever located, charging freight from these points, and (5) agreement concerning the method to be used in calculating the delivery charge.[3]

. . . .

The system is thus essentially noncompetitive. When a producer makes a shipment by a cheaper method of transportation than that assumed in the computation of his price and when he makes a charge for delivery from a basing point which is farther from the buyer than is his own establishment, he collects "phantom freight." His ability to do so arises from

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[3] *T.N.E.C. Monograph No. 21*, p. 148.

> the fact that other producers employing the cheaper means of transportation and those located closer to the buyer make no attempt to undercut his price. When he makes a charge for delivery from a basing point which is nearer to the buyer than is his own establishment, he "absorbs" freight. His ability to do this must be attributed to the fact that the whole level of prices established by the system is high. When a producer is not located at the basing point from which he quotes his prices, his "mill net realization" varies with the amount of "phantom freight" and "freight absorption" involved in different sales. This variation, again, results from the fact that distant producers do not undercut the prices which he quotes on sales made in the area adjacent to their mills, while he sets his own prices at figures which enable them to sell in the area which would otherwise belong to him. "Cross-hauling" and the "inter-penetration of market territories" show that each seller is voluntarily foregoing his competitive advantages in order to support the system as a whole. Sellers who are close to consumers do not underbid those who are far away. Sellers who are located on waterways charge an all-rail freight. Sellers whose efficiency is high ask prices which enable the less efficient to survive. Such behavior cannot be said to be competitive.[4]

Industry spokesman, on the other hand, claimed that the delivered-price system of the steel industry was highly competitive because any seller could enter the market of any other (by absorbing freight). Interpenetration of markets, it was stated, prevented the development of local monopolies.

When the steel industry abandoned the basing-point system in favor of the uniform f.o.b. mill pricing method, steel fabricators all over the country, but especially those distant from their steel suppliers, became greatly concerned. Much confusion attended the change. Under these circumstances the Maryland State Planning Commission undertook to study the effects of f.o.b. mill pricing on the iron and steel industry of Maryland.[5]

By far the largest producer of iron and steel in Maryland was the Sparrows Point plant of the Bethlehem Steel Company. This plant, the second largest steel mill in the world, produced all the state's pig iron and 97 per cent of the ingots and steel for casting.

In order to determine the effects of f.o.b. mill pricing, the commission studied the market for hot-rolled sheet. In July, 1947, this product was sold through a multiple basing-point system with eleven published bases. These bases, together with prices for July, 1949, were as follows:

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[4] *Ibid.*, p. 150

[5] *Survey of the Impact of F.O.B. Mill Pricing on Maryland Manufacturers* (Publication No. 61) (Baltimore, 1949), chap. v. This study investigated the effects of f.o.b. mill pricing on all classes of manufacturers in Maryland, including iron and steel producers.

	Price per Net Ton		*Price per Net Ton*
Pittsburgh	$65.00	Youngstown	$65.00
Chicago	65.00	Sparrows Pt	65.00
Gary	65.00	Granite City	72.50
Cleveland	65.00	Middletown, Ohio	65.00
Birmingham	65.00	San Francisco, Los Angeles, Seattle	79.00
Buffalo	65.00		

On the basis of rail freight rates and water-shipment rates as of August 1, 1949, the natural market of Sparrows Point was as indicated in Exhibit 5.[f]

The commission's report continued.

What are the implications of this natural market? Is the Sparrows Point plant, as well as other Maryland producers, in a favorable position? That is, will she gain or lose sales by being limited to the Sparrows Point natural market? Exhibit 6 describes the natural market for Sparrows Point, assuming prices of July, 1949, and bases of 1947. Column (1) lists the estimated consumption by the metalworking industry for each state wholly or partly inside the natural market for hot-rolled sheets. The consumption figures were calculated on a 1948 basis, and in some instances were estimated percentages of a state's total consumption. If the figures included all consumption they would be approximately 30% higher, but they include only the consumption by metalworking industries. The total consumption for the United States of finished steel products was about 66 million tons in 1948. The metalworking industry consumed about 46 million tons.

Column (2) gives the percentage of the total rail-water natural market consumption for each district. Pennsylvania is the largest consumer on the East Coast, while California is the big purchaser on the West Coast.

Column (3) shows the rated capacity for each competing district. Column (4) lists the percentage of the total market capacity each district represents. Note that the Sparrows Point capacity is over 60% of the total.

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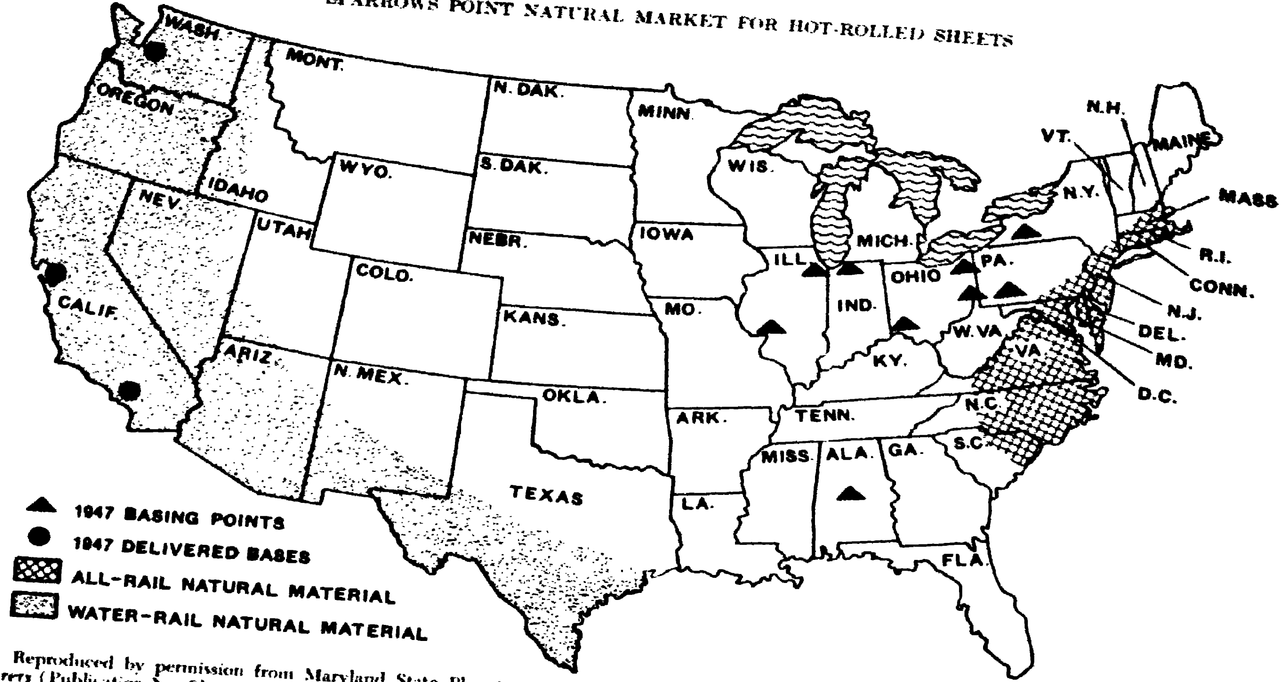
[f] Example of calculation of delivered prices of hot-rolled sheet at Greensboro, North Carolina:

From:	*F.O.B. Mill Price*	*Actual Rail Freight Cost*	*Delivered Price*
Pittsburgh, Pa.	$65.00	$16.40	$81.40
Middletown, Ohio	65.00	14.00	79.00
Birmingham, Ala.	65.00	13.00	78.00
Sparrows Point, Md.	65.00	12.00	77.20

The delivered price at Greensboro, therefore, was $77.20, regardless of the origin of the steel. Greensboro, under a uniform f.o.b. mill price system, would be in the natural market of Sparrows Point.

Exhibit 5

SPARROWS POINT NATURAL MARKET FOR HOT-ROLLED SHEETS



Reproduced by permission from Maryland State Planning Commission, *Survey of the Impact of F O B Mill Pricing on Maryland Manufacturers* (Publication No. 61) (Baltimore, 1949), p. 55

Columns (5) and (6) show the excess demand or supply for each producing area assuming production at 100% capacity. Maryland is shown to have an excess supply of 1½ million tons. Consequently it must sell the larger proportion of its production outside Maryland.

Now if the assumption is made that all competitors of Sparrows Point, located inside the natural market, produce at 100% capacity, and sell all they produce, Sparrows Point could still sell over 100% of its rated capacity, as shown in Exhibit 6. Obviously, using these assumptions, Sparrows Point will be very favorably affected, as far as hot-rolled sheets are concerned, by a shift to f.o.b. mill pricing. It could sell all it could produce, and even expand existing capacity without suffering from unused plant capacity.

. . . .

Under a basing-point system what would sales be for Maryland's steel industry? Unfortunately, sufficient information was not obtainable to make our discussion more realistic. However, some past results may be used to draw tentative conclusions.

First, assume consumption in the metalworking industry in various states as of 1948. Second, assume that sales under a continuing basing-point system would be made more or less in proportion to the 1938 distribution. For example, in 1938 Baltimore supplied Massachusetts with 4.9% of Massachusetts purchases. Now, if proportional distribution is assumed, Baltimore would, under a continuing basing-point system, still supply Massachusetts with 4.9% of her purchases. In 1948 Massachusetts consumed 287,051 tons of hot-rolled sheets and strip. Consequently it is assumed that under a basing-point system Maryland would supply this state with 4.9% of 287,051, or 14,066 tons. Now, by calculating in a similar fashion for each state, Baltimore's total sales to the metalworking industry under a basing-point system may be calculated. It should be remembered that these estimates may be fairly close, for under a continuing basing-point system steel mills would tend to retain old customers except during peak years of production or during war periods. There would of course be changes in distribution in a growing economy because of new customers entering the steel market.

Now examine Exhibit 7. Column (1) contains the consumption figures in the metalworking industry for various states in 1948. Column (2) lists the percentage of sales to each state by Eastern Pennsylvania and Delaware mills. Column (3) is the actual sales made by Eastern Pennsylvania and Delaware firms using our assumption. This was calculated by multiplying columns (1) and (2).

Column (4) gives the percentage of sales made by Baltimore firms to various consuming districts, and column (5) shows the sales in tons (column (1) times column (4)). Columns (6) and (7) are the percentage and actual sales by West Coast firms under our assumptions.

Column (8) is the natural market sales taken from Exhibit 6. Columns (9) and (10) show the change in sales that result if there were a shift from the basing-point system to a system of uniform f.o.b. mill pricing.

Exhibit

CONSUMPTION AND PRODUCTION OF HOT-ROLLED SHEETS

		Per Cent of State Included	(1) Consumption in Tons	(2) Per Cent of Total Rail-Water Market
All-rail states:				
Connecticut		100	251,832	10.72
Delaware		100	12,291	0.52
District of Columbia		100	2,488	Neg.[4]
Massachusetts		100	287,051	12.22
New Jersey		100	325,447	13.86
Rhode Island		100	23,839	1.01
Virginia[1]		75	22,304	0.95
North Carolina[1]		75	8,938	Neg.
South Carolina[1]		25	559	Neg.
New Hampshire[1]		25	2,187	Neg.
Maine[1]		10	456	Neg.
West Virginia[1]		10	1,686	Neg.
Maryland		98	146,565	6.24
100% Baltimore City	142,827			
50% Other Maryland[1]	3,738			
New York		33	227,873	9.70
100% New York City	207,101			
20% Other New York[1, 2]	20,772			
Pennsylvania		57	570,431	24.29
100% Lancaster-York	47,292			
100% Philadelphia	335,562			
100% Reading	128,523			
50% Other Penn.[1, 3]	59,054			
TOTAL ALL-RAIL MARKET			1,887,037	79.51
Rail-Water Market				
Texas[1]		50	49,629	2.13
New Mexico[1]		40	125	Neg.
Arizona[1]		70	2,670	Neg.
Nevada		95	90	Neg.
Idaho		20	160	Neg.
California		100	364,900	15.54
Oregon		100	14,172	.60
Washington		100	29,245	1.25
Utah		10	397	Neg.
TOTAL RAIL-WATER MARKET			461,397	19.52
TOTAL ALL-RAIL AND RAIL-WATER MARKET			2,348,434	100.00[5]

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[1] Estimated from Map I

[2] Excluding Albany, Binghamton, Elmira, Buffalo, Rochester, Syracuse, Utica, and New York City.

[3] Excluding Erie, Pittsburgh, Sharon, New Castle as well as those listed

[4] Neg. means less than 0.05 per cent

Source: Report by *Iron Age* to the metalworking industry. "Steel Consumption in 1948." Reproduced
Note: If Sparrows Point had only 60.53% of market, it would sell 1,421,420 tons, which is over 100

AND STRIP IN SPARROWS POINT NATURAL MARKET, 1948

	(3) Capacity in Tons (1948)[6]	(4) Per Cent of Total Capacity	(5) Excess Demand	(6) Excess Supply
All-rail states:				
Connecticut	150,000	6.54	101,832	
Delaware				
District of Columbia				
Massachusetts				
New Jersey	172,000	7.50	153,447	
Rhode Island	31,200	1.36		7,361
Virginia[1]				
North Carolina[1]				
South Carolina[1]				
New Hampshire[1]				
Maine[1]				
West Virginia[1]				
Maryland	1,388,000	60.53		1,241,435
100% Baltimore City				
50% Other Maryland[1]				
New York				
100% New York City				
20% Other New York[1, 2]				
Pennsylvania	88,100	3.84	482,331	
100% Lancaster York				
100% Philadelphia				
100% Reading				
50% Other Penn.[1, 2]				
TOTAL ALL-RAIL MARKET	1,829,300	79.77	57,737	
Rail-Water Market				
Texas[1]	9,000	0.39	40,629	
New Mexico[1]				
Arizona[1]				
Nevada				
Idaho				
California	454,730	19.83		89,830
Oregon				
Washington				
Utah				
TOTAL RAIL-WATER MARKET	463,730	20.22		2,477
TOTAL ALL-RAIL AND RAIL-WATER MARKET	2,293,030	100.00[7]	55,260	

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[5] Negligible difference 0.97 per cent of total.

[6] Taken from *Directory of Iron and Steel Works of the United States and Canada* (1948).

[7] Figures will not necessarily total 100% because of rounding.

by permission from Maryland State Planning Commission, *op. cit.*, p. 57.
per cent of capacity.

Exhibit

1948 MARKETS UNDER F.O.B. AND BASING-POINT SYSTEM

	(1) Total Consumption 1948	(2) Per Cent Received from East Pennsylvania and Delaware	(3) Tons Received from East Pennsylvania and Delaware	(4) Per Cent Received from Baltimore	(5) Tons Received from Baltimore
Maine	4,557	2.5	114	11.0	501
New Hampshire	8,749			0.2	17
Vermont	8,447			3.5	296
Massachusetts	287,051	5.2	14,927	4.9	14,066
Rhode Island	23,839	0.2	48	8.0	1,907
Connecticut	251,832	0.9	2,266	2.3	5,792
New Jersey	325,447	0.8	2,604	37.6	122,368
New York	681,742	0.7	4,770	13.7	93,361
Pennsylvania	997,057	0.9	8,974	22.9	228,326
West Virginia	46,859	Neg.*		0.3	141
Delaware	12,291	29.8	3,663	16.6	2,040
Maryland	150,304	5.5	8,267	34.5	51,855
District of Columbia	2,488			15.5	386
Virginia	29,859	0.9	269	20.4	6,091
Ohio	1,383,791	Neg.		0.1	1,384
Kentucky	77,224			0.4	309
Indiana	708,255			Neg.	
Illinois	1,090,245			0.2	2,180
Michigan	1,967,594			Neg.	
Wisconsin	803,297			0.1	803
Missouri	198,432				
Iowa	129,149			0.1	1,292
Minnesota	82,289			0.1	823
Kansas	25,028			0.4	100
Nebraska	29,828			0.1	298
South Dakota	2,266				
North Dakota	802				
Montana	1,153				
Idaho	802			27.1	217
Wyoming	339				
Colorado	14,905				
Alabama	54,380				
Georgia	47,854	0.4	191	7.1	3,398
Florida	18,000	3.1	558	5.5	990
Mississippi	2,521			1.8	45
North Carolina	11,918	0.5	60	4.3	512
South Carolina	2,235			1.2	27
Tennessee	63,538	Neg.		0.2	127
Arkansas	3,369				
Oklahoma	19,775			0.1	20
Louisiana	32,790			2.1	689
Texas	99,257	0.2	198	11.7	11,613
New Mexico	312				
Utah	3,969			5.5	183
Nevada	104			4.4	5
Washington	29,245	6.0	1,755	46.8	13,687
Oregon	14,172	2.1	298	35.7	5,059
California	364,900	0.5	1,824	39.0	142,311
Arizona	3,814	11.9	454	8.3	317
Total	10,118,074	0.3	51,240	7.2	713,536

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* Neg. means less than 0.05%.

Sources: Report by *Iron Age* to the metalworking industry, "Steel Consumption in 1948," (81st Congress, Senate Report No. 44.) *Changes in Distribution of Steel 1940-47*, 1949, Table 6, pp. 27-28. Reproduced by permission from Maryland State Planning Commission, *op. cit.*, p. 60.

ASSUMING DISTRIBUTION PROPORTIONAL TO 1938

	(6) Per Cent Received from West Coast	(7) Tons Received from West Coast	(8) Natural Market (Tons)	(9) If Changed to F.O.B. Mill Pricing	(10)
				Gain (Tons)	Loss (Tons)
Maine			456		159
New Hampshire			2,187	2,170	
Vermont					298
Massachusetts			287,051	258,058	
Rhode Island			23,839	21,884	
Connecticut			251,832	243,774	
New Jersey			325,447	200,475	
New York			227,873	129,742	
Pennsylvania			570,431	333,131	
West Virginia			4,086	4,545	
Delaware			12,291	6,588	
Maryland			146,565	86,443	
District of Columbia			2,488	2,102	
Virginia			22,394	16,034	
Ohio					1,384
Kentucky					309
Indiana					
Illinois					2,180
Michigan					
Wisconsin					803
Missouri					
Iowa					1,292
Minnesota					823
Kansas					100
Nebraska					298
South Dakota					
North Dakota					
Montana					
Idaho	16.3	131	160		188
Wyoming					
Colorado					
Alabama					
Georgia					3,589
Florida					1,548
Mississippi					45
North Carolina			8,938	8,366	
South Carolina			558	531	
Tennessee					127
Arkansas					
Oklahoma					20
Louisiana					689
Texas	Neg		49,629	37,818	
New Mexico			125	125	
Utah	11.5	456	397		242
Nevada	84.2	88	90	6	
Washington	28.9	8,452	29,245	5,351	
Oregon	27.5	3,897	14,172	4,918	
California	35.2	128,445	364,900	92,320	
Arizona	19.1	728	2,670	1,171	
Total	1.8	142,197	2,348,433	1,455,552	14,092
				NET GAIN 1,441,460	

with all previous base prices becoming f.o.b. mill prices, i.e., without increases of Baltimore prices or decreases of f.o.b. prices of competing mills.

The results are amazing. Under a basing-point system mills in the Sparrows Point natural market area could sell 906,973 tons of hot-rolled sheets and strip to the metalworking industry, while under an f.o.b. mill system sales would be 2,348,434. This would represent a 1,441,460-ton gain in sales.

If the limiting assumptions are removed, the results might be different. Nonetheless, as far as hot-rolled sheets are concerned, Maryland stands to be in a far better competitive position under f.o.b. mill pricing in the steel industry.[7]

QUESTIONS

1. How do you account for the expansion of the Sparrows Point market under f.o.b. mill pricing?
2. In view of the expansion of the Sparrows Point market under f.o.b. mill pricing, does it appear that the previous policy of basing-point pricing was unsound *from the standpoint of the industry?*
3. Is the expansion of this market an indication of greater competition or of regional monopoly in the steel industry?

APPENDIX

SOME FACTORS IN THE PRICING OF STEEL[8]

THE DEMAND FOR STEEL

IMMEDIATE SOURCE OF DEMAND

Orders for steel come mostly from companies using the products of the steel industry as raw materials in making goods or as equipment in producing services.

Companies purchasing steel have been classified, and estimates of the percentage of the total steel production of the United States purchased by each class are shown in the table on page 285.

In connection with the above classification interesting observations may be made. First, the purchasers of steel are principally companies engaged in the production of producers' and consumers' durable goods. An exception is the container industry which manufactures tin cans, an article classified as a perishable good since it is generally used but once and discarded. Second, in recent years there has been a marked increase in the percentage of steel purchased by consumers' durable goods industries, such as the automotive and household appliance industries, and a decrease in the percentage of steel purchased by producers. durable goods industries, such as the railroad industry. In this connection "Miscellaneous," which has shown such rapid growth, includes many industries producing consumers' durable goods such as refrigerators, air conditioning units, stoves, etc. Third, "Exports" in some years account for an appreciable amount of total steel sold. Since the economics of export trade involves conditions not present in the domestic market, the subject of prices and pricing methods in the steel export trade have not been included in this study.

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[7] *Survey of the Impact of F.O.B. Mill Pricing on Maryland Manufacturers* (Publication No. 61) (Baltimore, 1949), pp. 54–61.

[8] Reproduced from *T.N.E.C. Hearings* (76th Cong. 3d Sess.), Part 26, Exhibit No. 1410, pp. 13895–908. This exhibit was offered in testimony by the United States Steel Corporation.

Most industries purchasing steel are characterized by large companies; in the automotive, container, agricultural implements, household durable goods and shipbuilding industries, a relatively few large companies comprise a substantial percentage of the total production of their respective industries.[9] In purchasing their steel requirements these large companies usually come into the market with orders of considerable magnitude. The demand for steel therefore consists, to a great degree, in large-sized orders placed by relatively few companies.[10]

PERCENTAGE DISTRIBUTION OF HOT ROLLED IRON AND STEEL PRODUCTION AMONG MAJOR CONSUMING INDUSTRIES*

Industry	1938	1932-38 Average	1926-31 Average
Automotive	17.3	20.8	16.3
Construction	18.8	16.0	19.9
Railroads	6.1	10.1	17.9
Container	9.1	8.4	4.7
Agriculture	4.7	6.0	6.0
Oil, gas, and water	7.4	6.0	8.3
Exports	7.5	5.5	5.9
Machinery	3.5	4.2	3.8
Furniture and furnishings	3.6	3.6	
Shipbuilding	1.6	0.9	0.9
Mining	0.3	0.5	0.7
Miscellaneous	20.1	18.0	15.6†

* M. W. Worthing, *Distribution of Steel Products to Major Consuming Industries*, United States Steel Corporation, October 30, 1939. Computations made by apportioning individual hot-rolled product totals on the basis of *Iron Age* distribution reports and by allocating jobber shipments to ultimate consumers.

† "Miscellaneous" for the period 1926-31 includes "Furniture and Furnishings."

GEOGRAPHIC DISTRIBUTION

Orders for steel arise for the most part in concentrated geographical areas. The bulk of tonnage business originates in a belt extending east of the Mississippi, and north of the Ohio rivers, tapering off toward

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[9] *Big Business, Its Growth and Its Place*, Chart 3, p. 42 (Twentieth Century Fund) *Exhibit No. 896 submitted to the T.N.E.C.*, July 11, 1939 (based on Census of Manufactures).

[10] Sales statistics of the subsidiaries of United States Steel Corporation show that in 1937, 941 customers had billings over $100,000 each and accounted for 73% of gross sales, in 1938, 663 customers had billings over $100,000 each and accounted for 68% of gross sales.

Philadelphia and New York; but important markets exist outside this zone, particularly for products required by the oil and canning industries. Although major markets for particular steel products vary both as to location and degree of importance, the principal centers of the composite demand for steel in their general order of precedence are:[11]

1. Detroit
2. Chicago-Gary
3. Pittsburgh
4. Cleveland
5. Los Angeles
6. Youngstown
7. Milwaukee
8. San Francisco
9. Newark
10. New York
11. Cincinnati
12. Houston
13. Buffalo
14. St. Louis
15. Toledo

CHARACTERISTICS OF DEMAND

The demand for steel is subject to tremendous cyclical fluctuations. This is due primarily to the great cyclical fluctuations in the demand for producers' and consumers' durable goods in the manufacture of which steel is consumed.

DERIVED NATURE OF DEMAND

The demand for new durable goods is highly sensitive to changes in the demand for services which the durable goods perform. This may be demonstrated by a simple theoretical illustration. A railroad needs five hundred cars filled to capacity to carry 10,000,000 passengers a year. Each year fifty cars normally wear out and are replaced. More people decide to travel by railroad and passenger traffic increases 10 per cent, so that 11,000,000 passengers a year must be accommodated. This requires fifty more cars which must be acquired immediately to meet the increased demand for passenger service. Therefore, in the year that this increase occurs the railroad has to buy one hundred cars instead of the fifty usually purchased for the normal replacement program. Thus a 10 per cent increase in the demand for passenger service results in a 100 percent increase in the demand for railroad passenger cars. This is sometimes called by economists the "acceleration principle." It works in reverse too. If passenger traffic decreased 10 per cent there would not be any demand at all for new passenger railroad cars, since only four hundred and fifty cars would be required to carry the 9,000,000 passengers left, no additional cars would be needed to replace the fifty worn out. In other words, a 10 per cent decrease in demand for passenger service would cause a 100 per cent decrease in the demand for new durable goods to perform such service.

DURABILITY AND DEMAND

The longer the life of durable goods the more sensitive is the demand for the new durable goods to changes in the demand for services. For example, in the simple theoretical illustration given above the average life of the railroad car was presumed to be ten years. Fifty cars normally had to be replaced annually. However, if the average life had been five years, 100 cars per annum would have to be replaced. In that event a 10 per cent increase in the demand for passenger service would have resulted in only a 50 per cent increase in the demand for new railroad cars, and a 10 per cent decrease in the demand would have resulted in a 50 per cent decrease in the demand for new equipment. On the other hand, if the average life of a car had been twenty years, only twenty-five cars would have to be replaced annually. Therefore a 10 per cent increase in the demand for service would have caused a 200 per cent increase in the demand for new railroad cars. In the event of a 10 per cent decrease in the demand for service, the replacement demand for new equipment would not only disappear entirely, but twenty-five additional cars theoretically would be removed from service and be available to meet the normal replacement demand in the following year.

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[11] Based on estimates made in 1937 for the subsidiaries of the United States Steel Corporation of a "normal" industry-wide market for the following products: heavy rails, heavy structural shapes; plates, sheared and universal, fabricated structural work, merchant bars, including reinforced concrete bars and light structural shapes; black sheets, galvanized sheets, hot rolled strip; rods, wire and wire products; tin mill products; pipe and tubing.

Thus, while the demand for new durable goods is highly sensitive to change in the demand for services which the durable goods perform, the degree of such sensitivity and the magnitude of the resultant fluctuation in demand depends on the life span of the durable goods, fluctuations in the demand for new durable goods will be progressively greater as durability increases. In actual practice many qualifications to this principle exist,[12] nevertheless it is fundamental in the demand for durable goods.

POSTPONABILITY OF PURCHASE OF DURABLE GOODS

The purchase of durable goods usually can be easily postponed, and is postponed when income is scant or prospects for the profitable use of additional durable goods are discouraging. As a result of postponability of purchase, producers' durable goods industries feel an immediate effect on demand resulting from the contraction of producers' income as expenditures for capital goods are deferred and the income of the purchaser is directed primarily to meeting necessary out-of-pocket expenses. In addition, even though the immediate business outlook is favorable, expenditures for capital equipment may be postponed if the long term business outlook is unfavorable; the business man must anticipate a reasonable return over the life of the investment before tying up his capital in durable equipment. After a prolonged depression, with purchases of durable goods almost completely eliminated, increased profits and re-turning confidence as to the future may stimulate a great upward surge in the demand for replacements previously postponed and also for new equipment for expansion.

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[12] (a) The actual age distribution of the stock of durable goods in use might change in different years. (b) The effect of obsolescence is to increase replacement rates and therefore limit the magnitude of fluctuations, if it is a constant factor from year to year. If an erratic factor, it would increase the fluctuations if it occurred in normal or above normal years, or if it occurred in sub-normal years it would limit the fluctuation. (c) For producers' durable goods, obsolescence can be brought about by shifts in demand, the development of new products, the introduction of new techniques of production, discovery of new resources or new methods of using resources, migration of industry from one area to another, and similar changes. In the field of consumers' durable goods, style changes and shifts in consumers' demands are among the causes which may result in shortening the otherwise useful life of durable goods.

In like manner, consumers' durable goods industries feel the impact of declining consumer income, as funds available are used to buy the necessities of life and existing consumers' durable goods, such as automobiles, are made to last longer than anticipated, or are discarded without replacement under stringent conditions. Increased consumer income, actual and anticipated, will create a strong revival in demand for consumers' durable goods as replacements are made and new equipment purchased.

As previously indicated, the "acceleration principle" becomes more potent as durability of a product increases. As a result the magnitude of expansion and contraction in demand for products of the durable goods industries will be greater than for non-durable goods industries. These fluctuations of demand for new durable goods will be further magnified by the postponability of purchase of these goods; a producer will buy coal, oil or electrical energy long after he has decided he must postpone purchase of capital equipment, and a consumer must buy food, clothing and other necessities even though he cannot afford a new car or a refrigerator.

TOTAL DEMAND FOR STEEL IS INELASTIC

The magnitude of these cyclical fluctuations in demand cannot be materially affected by adjustments in the price of steel because the total demand for steel is inelastic. This is due, first, to the derived nature of the demand for steel, and, second, to the limited number of substitutes for basic steel products, and conversely the limited number of products for which steel may be substituted.

As previously indicated, the demand for steel is derived from the demand for the services which products made of steel perform. If a change in the price of steel is to influence the demand for the finished product in which the steel is used, two conditions must exist: the cost of steel must represent a substantial percentage of the selling price of the finished article, and the demand for the finished article itself must be such that it responds to changes in its price. This is not generally the case; steel as a raw material usually represents a small percentage of the total cost of the finished product, and the major industries purchasing steel have a rather inelastic demand for their products.[13]

The automotive industry, which during recent years has been the largest single customer of the steel industry, is a typical example of the derived nature of the demand for steel and the resultant inelasticity of such demand. The cost of steel in a low-priced automobile retailing between $700.00 and $800.00 is about $85.00, or roughly 10 per cent of the retail price. Roos and von Szeliski in a recent study contained in "The Dynamics of Automobile Demand"[14] estimated 1.5 to be a representative average of elasticity of demand for new automobiles; i.e., for every 1 per cent decrease in the price, the automobiles sold would increase 1.5 per cent. Since steel costs represent 10 per cent of retail price, a 5 per cent decrease in steel prices would permit a 0.5 per cent reduction in the price of automobiles, and according to such elasticity of demand would increase automobile sales to the extent of 0.75 per cent. The resultant increase in the demand for steel by the automobile industry would be negligible.

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[13] The approximate proportion of steel cost in price of finished product for various items is as follows: mile of railroad, 36.7%; apartment building, 10%; automobile, 10%; can of food, 8%; frame house, 6.2%; electric refrigerator, 3.4%; dairy barn, 3.2%; mile of reinforced highway, 0.7%.

EFFECT OF THE SUBSTITUTION FACTOR

Substitution of steel for other materials, or a reverse substitution, is not an important factor in the cyclical fluctuations in the demand for steel. If, through lower prices, steel could invade a major market served by other products, or if high relative steel prices meant invasion of major steel markets by substitute products, there would be imparted to the total demand for steel a degree of elasticity not now present. Steel possesses more physical strength per dollar of investment than any other existing product; wood and concrete have a restricted field in which they may be substituted for heavy steel. Glass, plastics, rubber, aluminum and certain alloys may serve as substitutes in specialized fields, but even in these cases price may be only one of many competitive factors involved. Therefore, price reduction would result in very little additional steel being sold as substitutes for other products, and a price advance, unless abnormal, probably would not result in additional competition from substitute products.

POTENTIAL ELASTICITY OF DEMAND FROM A PARTICULAR PRODUCER

Although the over-all demand for steel is inelastic and the total quantity bought would not be substantially different if the price within reasonable limits were lower or higher, the demand for steel from a particular producer possesses great potential elasticity. This readiness of a buyer to shift from one producer to another because of a lower price is due to the informed character of the buying of steel. Technical knowledge of the product to be purchased is available through laboratories of individual purchasers, trade associations and independent research agencies; exactly the same steel may, for the most part, be obtained from any one of a number of producers. Furthermore, the large size of individual purchases makes it worth-while for buyers to seek the lowest possible price. This propensity to shop is enhanced by knowledge of latest price quotations, by familiarity with psychological and other factors resulting in a "buyers" or a "sellers" market for all or particular products, and by a general understanding of approximate costs of steel production, indeed, a few purchasers[15] of steel operate completely integrated steel works to supply a portion of their requirements, and others[16] have semi-integrated and non-integrated capacity.

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[14] Publication of the General Motors Corporation based upon papers presented at a joint meeting of the American Statistical Association and the Econometric Society in Detroit, Michigan, on December 27, 1938.

[15] Ford Motor Company and International Harvester Company.

Thus, potentially, the demand for steel from an individual producer is elastic and buyers are often in a position to exert bargaining pressure to obtain the lowest possible prices, especially when the steel industry is not operating near capacity.

The Supply of Steel

GEOGRAPHIC CONCENTRATION

The most economical source of steel is that location at which the raw materials can be assembled, the steel produced and delivery to the market effected at the lowest possible total cost. In determining plant location[17] assembly costs are most important, more than four tons of raw materials must be assembled for every ton of steel produced. Although production costs are subject to variations due primarily to geographical wage rate differentials, these variations are supplementary to and, in a measure, compensatory for otherwise uneconomical assembly or delivery costs.

The approximate amounts of principal raw materials required per ton of pig iron are: 4075 pounds of iron ore (assuming ore of a reasonably high metallic content), 2700 pounds of coking coal and 900 pounds of limestone. Another 1500 pounds of coal may be consumed for power and heating before a ton of finished steel product has left the mills. The greater proportion of the raw materials is used in the blast furnace, but integrated steel works have developed from blast furnace plants because (a) as steel approaches the finished stage the cost of shipment becomes a smaller percentage of the cost of the product to the buyer, (b) integration assures more constant and reasonably full utilization of blast furnaces and open hearths, (c) economies of converting molten iron into steel and other heat conservation factors are important in the economical production of steel.

Limitations imposed by the necessity for the most favorable combination of assembly, production and delivery costs have confined steel production to a few geographical areas.

The most favorable combination of the three variables is probably to be found at Lake Erie and Lake Michigan ports and in the Pittsburgh district (including the Mahoning and Ohio Valleys). These locations[18] were primarily determined by the assembly costs of Lake Superior ores which are the backbone of the steel industry in the United States and supply about 82 per cent of the ore consumed in the country, and of the finest metallurgical coking coals which are found in Western Pennsylvania, West Virginia and Kentucky. The assembly cost of limestone, which is well distributed and the least important of the major raw materials, is usually an incidental factor.

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[16] American Car and Foundry Co.; American Locomotive Co.; Atchison, Topeka and Santa Fe Railroad Co., Continental Can Co., Simonds Saw and Steel Co., Timken Roller Bearing Co., Inc.

[17] Availability of a large water supply is important in steel mill location.

[18] Although Pittsburgh historically was established as a steel producing center before Lake Superior ores and coking coal came into general use, its growth and the maintenance of its dominant position has been based on its economical accessibility to these resources.

Comparative assembly costs at principal production centers in this area have been estimated as follows:

ESTIMATED ASSEMBLY COSTS IN THE PRODUCTION OF PIG IRON, SUMMER OF 1937*

(In Dollars per Gross Ton of Pig Iron)

PRODUCING CENTER	IRON ORE	COAL	FLUX	TOTAL	ANNUAL BLAST FURNACE CAPACITY	
					Thousands of Gross Tons	Percentage of U. S. Total
Weirton-Steubenville	$5.508	$0.468	$0.337	$6.313	2,093	4.2
Pittsburgh	5.804	0.284	0.337	6.425	11,521	23.0
Cleveland	3.497	2.714	0.241	6.452	2,685	5.4
Buffalo	3.497	2.909	0.241	6.647	3,267	6.5
Detroit	3.497	3.249	0.086	6.832	1,423	2.8
Youngstown	5.193	1.979	0.170	7.342	6,592	13.2
Chicago	3.487	3.867	0.241	7.595	10,266	20.5
Total						75.6

* Woehling, Martin, "Comparative Assembly Costs in the Manufacture of Pig Iron," *Pittsburgh Business Review*, VIII, No. 1, January 31, 1938, pp. 21-25, Table 2.

Assembly costs at these locations vary, the importance of each component of the costs is emphasized by the difference of $1.17 in favor of Pittsburgh over Chicago due entirely to Pittsburgh's fortunate position in the center of the finest metallurgical coking coal fields in the country.

Although primarily based upon assembly costs, the growth of these great steel production centers to their present size would not have been possible if outlets for at least a considerable part of their products did not exist fairly close at hand; all the production centers coincide with, or are adjacent to, major centers of steel demand. However, the location of these production centers depends only in part on relative assembly costs and the magnitude of local demand for a particular product; it depends, among other things, on the conformation of the market for each product and for the group of products that may be economically produced together.[19]

For example, hot rolled sheets, cold rolled sheets and tin plate, which are produced at the Gary sheet and tin mills of a subsidiary of United States Steel Corporation with all the attendant economies of large scale production, are products of virtually the same integrated process. Major outlets for hot rolled sheets are Chicago, Detroit, and Indiana with important sources of demand in Iowa, Minnesota, and Ohio; Detroit is the principal market for cold rolled sheets, and Chicago is an important market for tin plate. A similar situation exists at the Irvin Works of this same subsidiary in the Pittsburgh district which rolls the same three products. Ohio and adjacent West Virginia counties, Pittsburgh and Philadelphia are major markets for its hot rolled sheets. Cold rolled sheets are principally shipped to Cleveland, other Ohio centers and Philadelphia. The Irvin Works may also supplement Gary in the Detroit market with hot and cold rolled sheets in periods of peak demand, while Metropolitan New York is the major market for its large output of tin plate.

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[19] Committee on Iron and Steel Price Research, National Bureau of Economic Research Conference on Price Research, *Proposals for Research on Prices and Pricing Policies in the Iron and Steel Industry* (1939).

This market structure of groups of products that may economically be produced together accounts in part for production patterns with such apparent inconsistencies as limited capacity at Detroit and excess capacity, as compared to local demand, at Pittsburgh. The effects of historical development and the immobility of steel making equipment will be discussed later.

Birmingham, Alabama, and vicinity is another location with a favorable combination of assembly and production costs. Assembly costs at Birmingham are undoubtedly the lowest in the country—iron ore, coal and flux being in close proximity. In this case low assembly costs compensate in part for the comparatively poor quality of the raw materials; iron content of the ores is low and phosphorous content high, making conditioning and sintering desirable; the coal requires washing before coking. With wage rates lower than other districts, production costs are also economical, although basic wage rates have been rising in the South. These advantages of assembly and production costs are offset by remoteness from major markets; a substantial part of the tin plate produced at the large plant recently erected by Tennessee Coal, Iron & Railroad Company, another subsidiary of United States Steel Corporation, at Fairfield, Alabama, is shipped to the West Coast and Hawaii.

Sparrows Point, Maryland, is strategically located. Based on the use of high grade imported ores, iron ore costs have been estimated[20] to be less at Sparrows Point than at Lake Erie and Pittsburgh area plants, which advantage is offset, in part at least, by higher assembly costs for coal and limestone. Its accessibility to the large markets of the eastern seaboard, and its ability to compete on the West Coast via all-water transportation due to tidewater facilities, make economical distribution costs a major factor in the favorable location of Sparrows Point.

Combined assembly, production and delivery costs make possible integrated steel production on a commercial basis in only one other geographical area at the present time;[21] Colorado and Utah both possess iron ore, fair coking coal and limestone in sufficient quantities and within reasonable assembly distance of each other. Due to prohibitive distribution costs, however, this district must depend, in the main, on local demand for special products. At Pueblo, Colorado, the Colorado Fuel and Iron

[20] Maryland State Planning Commission, *The Iron and Steel Industry—Blast Furnaces, Steel Works and Rolling Mills*, November 1938, p. 14.

[21] With the exception of certain areas with small local ore deposits, capable of supporting limited operations, i.e., ore deposits of New Jersey, Eastern Pennsylvania, and the Adirondacks, economically accessible to Pennsylvania coal fields.

Corporation, cognizant of this situation, produces principally rails and track accessories for Western roads, and wire products for farm and ranch consumption. At Ironton, Utah, the Columbia Steel Company, a subsidiary of United States Steel Corporation, operates a blast furnace whose pig iron output is taken in part by its West Coast steel mills near Los Angeles and San Francisco and in part by local buyers. California steel mills also use a considerable amount of scrap obtained locally.

Although it is an important steel consuming area, the West Coast cannot support more than limited steel making capacity due to high assembly costs, particularly in the face of competition from Birmingham and Sparrows Point, both of which can serve this area on a more economical basis.

The principal steel producing centers of the nation, therefore, are confined to particular geographical areas where the raw materials for steel making can be economically assembled. Differences in the development and activity of these producing areas have been determined to a considerable extent by the relative costs of transporting steel to consuming areas. Many small non-integrated mills, however, are located outside the major producing areas where they may use local scrap, merchant pig iron or semi-finished steel to produce steel for consumption in the local area or may specialize in particular products to distribute in more widespread markets.

TECHNOLOGICAL ASPECTS

Steel making equipment installed at the producing centers is both costly and immobile, the economies of size inherent in steel manufacture have been important factors in determining the design of modern mills. The result is that the small plants of fifty years ago have been succeeded by complex and gigantic operating units.

Twenty years ago the coke used in blast furnaces was principally made in banks of simple beehive ovens, usually located at the mine. Today, it is made at or near the steel plant in long batteries of by-product coke ovens with alternating coking and heating chambers topped by coal larries, off-takes and collecting mains. In close proximity stand the tall cooling towers and scrubbers, the ammonia house and benzol plant used to obtain numerous by-products from the tars and gases emanating from the coking ovens, which are today recovered and put to use.

In 1880 the capacity of the most efficient blast furnace, a comparatively simple unit, was one hundred tons per day; at present the newest and most efficient furnaces are rated at 1100 to 1200 tons per day. This increased output has been accomplished not only by increase in size and better blast furnace practice, but by mechanical improvements and the development of auxiliary equipment. A blast furnace plant today is enormous and complicated. The furnace is a tall circular structure 90 to 100 feet high, built of firebrick and reinforced externally by a close-fitting steel shell. It is provided with apparatus for hoisting iron ore, coke and limestone to the top where they are charged into the furnace. Large pipes carry the gas generated in the furnace to the stoves where it is used for heating purposes. Besides each furnace stand four cylindrical stoves nearly as high as the furnace itself. These stoves heat air to high temperatures before it is blown into the furnace at the rate of five tons of air for every ton of iron produced. The impurities in the raw material are either burned out or accumulated in the slag which gathers on top of the molten metal. This slag is removed through the higher of two tapping holes. Through another tapping hole the molten iron is drawn at periodic intervals either into ladles to be carried to huge containers known as mixers subsequently to be taken to the open hearth and Bessemer converters, or into runners leading to the pig iron casting beds. A boiler house, power plant, pumping station, turbo-blower, stockyard, ore bridge, car dumper and raw material bins, all constitute important parts of blast furnace equipment.

The steel making equipment is equally complex and has increased in size as it has become more efficient. In 1890 the average open hearth furnace had a capacity of 22 tons per heat; in 1938 the average furnace capacity was 95 tons per heat and the largest 400 tons per heat. Even more spectacular has been the radical improvement in design and the increase in size of continuous rolling mills for flat rolled products in recent years. This acceleration of growth has been so dramatic that in 1936 a continuous rolling mill with a capacity of as much as 600,000 tons of finished flat rolled steel per year was unprecedented; yet in March 1938 a continuous strip mill was opened with an annual capacity of approximately one million tons.[23]

Equipment used in each stage of modern steel making is usually so combined as to perform a series of vertically integrated operations, conservation of heat and power requires continuous processes. Assurance of adequate sources of raw material and the elimination of purchasing expenses at each stage of operations are important factors in promoting further integration.

Vertical integration is a dual development in the industry. Non-integrated and semi-integrated producers desiring independence from producers of semi-finished steel and the owners of raw material reserves, and influenced by the possibility of additional savings, integrate toward the sources of their raw materials. Partly as a result of such movement and partly due to the decline in demand for steel used in producers' durable goods industries, producers of semi-finished and heavy steel have obtained outlets for their productive capacity by integration towards more highly finished products.

CAPITAL INVESTMENT REQUIREMENTS

This combination of huge units vertically integrated requires large capital investment. A modern blast furnace of about 1,000 tons capacity with the auxiliary equipment above mentioned costs four to five million dollars. The average investment required for a modern steel works of efficient size is approximately $100,000,000. Such a mill would be capable of producing about 1,000,000 tons of ingots per annum and would have diversified finishing equipment of sufficient capacity to convert about

[23] Republic Steel Company continuous strip mill, Cuyahoga Valley, Ohio

half the output into billets and other semi-finished steel and the other half into sheets and strip. Such an investment would not include operations prior to the assembly of raw materials at the plant site, i.e., the plant would be integrated only from coke plant to continuous rolling mills. Operating units may be and sometimes are much larger; a single continuous hot and cold rolling finishing plant alone may require an investment of $60,000,000.

Such large and complex equipment cannot be moved in response to geographical shifts in demand, and only extraordinarily great differential advantages of a new location justify scrapping existing facilities embodying large unamortized investment and long remaining service life. New areas of demand usually develop only for particular products or groups of products and it may be more economical for the established producer to install sufficient capacity at the existing location to compete in the new markets than to build integrated steel works at the source of the new demand. This decision may depend first, on the combination of products that can be economically produced together, and second, on whether the steel demanded can be produced by integrating new facilities with unused capacity at the existing location. Modernization and expansion at the established location may be rational, and the development of an individual company at a particular location may thus be perpetuated.

FACTORS IN EXPENDITURES FOR NEW PLANTS AND EQUIPMENT

The number of producers of any particular steel product bears a rather direct relationship to the minimum investment required to become such a producer. It is pertinent to inquire first, the source of the funds for such capital expenditures and second the inducements necessary for the investment of these funds

Source of Funds.—Funds for investment in new plants and equipment may be obtained from any one or a combination of the following sources: (1) Outside capital, both existing companies and promoters of new companies may borrow through the medium of notes and bonds or sell stock to obtain funds from this source. (2) Accumulated earnings; the availability of this source of funds over the years enabled existing companies to promote and keep pace with the upward trend in national steel consumption, and in addition helped small non-integrated and semi-integrated steel companies grow into large integrated units. (3) Depreciation and other reserves; this has been the primary source of funds for replacement and modernization programs.

Incentives for Investment—Profit Motive.—The normal incentive for investment is prospective profits. This may cause the expansion of existing companies; the development of non-integrated and semi-integrated companies into integrated companies being a case in point; or it may induce new companies to enter the field usually as non-integrated or semi-integrated specialists. The formation of a new integrated steel company, except by merger, would not be likely today since: (1) A large capital investment is necessary. (2) The technological and organizational difficulties in forming such a company are great. (3) The difficulty of obtaining an immediate market for the output of such a new company would be tremendous; great losses in early years would therefore seem inevitable.

Incentives for Investment—Obsolescence.—Obsolescence has been an important motive for capital expenditures by the steel industry in recent years. This has been due to: (1) New production techniques; the introduction of continuous hot strip mills and continuous cold reduction processes has brought about a major technological revolution in the industry. (2) The development of new products; cold reduced sheets and cold reduced tin plate have practically displaced the hot rolled products in major markets. In order to remain in markets demanding the new and better products, companies have had to purchase new equipment and construct new plants. (3) Shifts in demand; e.g., the marked increase in the demand for sheets, strip, tin plate and other steel required by consumer goods industries, and the decline until very recently in the demand for rails, plates and structural shapes. This shift has caused expansion of existing companies both to meet the new demand and to obtain outlets for otherwise unutilized ingot capacities.

SIZE AND NUMBER OF PRODUCERS

The producers of the bulk of tonnage steel are large in size and relatively few in number, which is a natural development in an industry requiring great capital investment as the result of large scale equipment, vertical integration and, in certain cases, horizontal integration. Principal producers (including subsidiaries) and their respective percentages of total ingot capacity for the year 1938 are indicated in the following table:[23]

PERCENTAGE DISTRIBUTION OF CAPACITY
AMONG PRODUCERS OF STEEL INGOTS
AND STEEL FOR CASTINGS 1938

Name of Corporation	*Percentage of Total* Annual Capacity*
United States Steel Corporation	35.3
Bethlehem Steel Corporation	13.7
Republic Steel Corporation	8.9
Jones & Laughlin Steel Corporation	5.0
National Steel Corporation	4.7
Youngstown Sheet & Tube Company	4.3
Inland Steel Company	3.9
American Rolling Mill Company	3.6
Wheeling Steel Corporation	2.4
Other smaller companies	18.2
Total	100.0

* This total does not include those companies that produce steel only for castings.

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[23] American Iron and Steel Institute, *Iron and Steel Works Directory of the United States and Canada, 1938*, pp. 401–2.

However, ingot capacities should not be the sole criteria of the size and number of producers, especially in the consideration of markets for particular products, since the number of companies and the percentage of the total that each has capacity to produce varies with individual steel products. The number is determined by: (1) The minimum investment required in equipment to produce the product, the prospective return thereon, and the relative simplicity of the operation. The investment formerly required for a steel mill and past profit margins must be considered in a study of any particular company, since most of the present producers entered the market under conditions different from those which today would face a newcomer. (2) The technological history of the product and the equipment used to produce it. (3) The nature of the demand for the product; its diversity and geographical distribution. (4) The historical development of the producers.

The percentage of the total represented by the capacity of any individual producer is principally a reflection of: (1) The historical development of that producer, particularly with reference to product specialization. (2) The technological history of the product and the equipment used to produce it. (3) The producer's location with respect to demand.

Under the influence of these factors there are distinct variations in the character and total number of producers of each steel product, and in the percentage of total capacity possessed by each producer for each product and in the geographical distribution of their plants.

CHANNELS OF DISTRIBUTION

Approximately 80 per cent of the steel produced by the steel industry is sold directly to consuming industries through the sales organizations of the producing companies so that in the majority of cases "sellers" and "producers" are interchangeable terms in the market for steel.

Jobbers and Warehouses.—The balance of the steel sold passes through the hands of jobbers, warehouses and other distributors which are essential in the sale of standardized products in small lots to widely scattered consumers, or where geographical conditions such as exist on the West Coast make this form of distribution particularly economical.

Although the jobber market is an important factor in the distribution of steel, the influence of this form of distribution on the pricing and marketing of the majority of steel products is negligible. Jobber outlets are, however, important elements in the marketing of galvanized sheets, concrete reinforcing bars, standard pipe, tubes, and merchant wire products.

Importance of Outlets.—Maintenance of outlets for semi-finished and finished steel is important for most members of the steel industry. The acquisitions of such outlets, by integrated producers, which occur from time to time, involve a change in the distribution pattern of the industry.

SUMMARY

The supply side of the steel market from a long term viewpoint is marked by these characteristics: (1) The areas of production are geographically concentrated in a few districts because of location of raw materials and transportation costs. (2) Large size equipment and vertical integration are typical of the industry; some companies are also horizontally integrated, while a number of semi-integrated or non-integrated companies are specialists in particular products. (3) Large capital investment is necessary; however, for certain products the investment necessary to become a producer is relatively much smaller than for others, and this seems to be an important controlling factor in determining the number of producers of a given product. (4) Generally speaking, producers are large in size and few in number, although in particular cases major producers of specialty products may be smaller non-integrated or semi-integrated units. (5) Investment in new plants and equipment arises both in response to prospective profits and as a result of obsolescence.

UNITED STATES STEEL CORPORATION & SUBSIDIARIES
COMPONENTS OF "FIXED" COSTS, UNDER 1938
CONDITIONS

Item	Approximate Percentage
Interest	4.56
Pensions	4.23
Taxes (other than social security and Federal income)	13.29
Depreciation and Depletion	16.20
Payroll	34.10
Social Security Taxes	1.37
Goods and Services Purchased from Others	26.25
Total	100.00

In contrast with many types of markets the steel market is one not easily entered by producers, or withdrawn from, once entry has been accomplished. The large investment required, technological and organizational difficulties, and the problem of obtaining an immediate market are obstacles to entry. The nonrecoverable costs that must be sunk in a steel company are not conducive to withdrawal if there is an opportunity for any return in excess of out-of-pocket expenses.

In much the same manner, the supply side of the steel market differs from other markets in that productive capacity cannot be easily adjusted to meet changing market conditions. Once capacity is installed, it is inelastic and cannot be removed except by scrapping, which ordinarily does not appear desirable due to the large investment involved, nor can capacity be easily expanded except by heavy capital expenditures requiring a considerable time interval.

CHARACTERISTICS OF COST IN THE INDUSTRY

"OVERHEAD" OR "FIXED" COSTS

There are certain costs in the steel industry which are approximately the same regardless of the amount of steel produced.[24] These costs are sometimes known as "overhead" or "fixed" costs. In the case of the United States Steel Corporation and its subsidiaries such "fixed" costs are composed of the elements shown in the table on page 298.

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[24] This presumes a company in operation. Complete shutdown naturally would decrease these costs sharply.

Other steel producers may have different percentages for the components of their "fixed" costs depending on the degree of integration and their capital structure. However, regardless of their composition, such costs are relatively large for major producers in the steel industry, and with low operating rates are a substantial percentage of total costs.[25]

"ADDITIONAL" COSTS

The costs over and above "fixed" costs represent the "additional" cost incidental to the production of each additional ton of steel, assuming the steel mill is already in operation. Recent studies of the experience of the United States Steel Corporation and its subsidiaries over the past ten years indicate that the addition to the total costs arising from the production of each addition ton[26] of steel is the same regardless of the operating rate at which the additional output is obtained as long as the other factors affecting costs remain constant. This phenomenon of constant "additional" costs covers an observable range of output which extends from around twenty per cent of capacity to slightly beyond ninety per cent of the physical limit of output. It is not certain that this relationship would hold true as the physical limit of capacity is reached since at that point the equipment may become overtaxed and for various reasons operate less efficiently and at greater cost. Less efficient reserve units may also be placed in service to meet the peak levels. In those circumstances

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[25] See the following table:

UNITED STATES STEEL CORPORATION & SUBSIDIARIES
PERCENTAGE OF "FIXED" TO TOTAL COSTS AT
VARIOUS RATES OF OPERATION, UNDER
1938 CONDITIONS

Operating Rate	Percentage of "Fixed" to Total Costs	Operating Rate	Percentage of "Fixed" to Total Costs
10	57.2	60	22.9
20	43.9	70	20.4
30	35.8	80	18.5
40	30.1	90	16.8
50	26.0	100	15.4

[26] The tons mentioned in describing the cost pattern are weighted tons. This means that each ton of Rolled and Finished steel product or of other tonnage product which is of a type whose average cost is less than the average cost of all Rolled and Finished steel products, is made to count as less than a full ton, while tons of products of a class which is on the average more costly than the average cost of Rolled and Finished steel products, are made to count more than a full ton. In this way the number of tons of all tonnage products shipped has been converted into equivalent tons of average-cost Rolled and Finished steel products. The result is that total costs of various tonnages shipped are made comparable where they would not be if unweighted tonnages had been used.

the additional costs incidental to the production of an additional unit of output would cease to be constant and would probably rise sharply. The percentage composition of these costs in the case of the United States Steel Corporation and its subsidiaries is indicated in the following table.

UNITED STATES STEEL CORPORATION & SUBSIDIARIES COMPONENTS OF "ADDITIONAL" COSTS, UNDER 1938 CONDITIONS

	Approximate Percentage
Taxes (other than social security and Federal income)	2.57
Depreciation and Depletion	4.25
Payroll	52.22
Social Security Taxes	2.08
Goods and Services Purchased from Others	38.88
Total	100.00

For companies less integrated than the United States Steel Corporation and its subsidiaries the percentage attributable to "Goods and Services Purchased from Others" would increase and the percentage of other components decrease.

AVERAGE COSTS

Since the average cost of producing a given ton of steel is the sum of the "additional" costs plus an amount equal to the "fixed" costs divided by the number of units produced, this "average" cost must necessarily be higher than the "additional" cost for nearly the whole range of operations almost to the limits of capacity.[27]

The components of the average cost of producing a ton of steel are, to a certain degree, largely outside the control of steel producers: wage rates tend to be inflexible and lag in adjustment, prices paid for goods and services are often fixed by outside agencies as they are in the case of railroad rates, interest is determined by factors in the money market, taxes are established by law, and depreciation and depletion charges cannot long be disregarded.

THE DYNAMICS OF THE MARKET FOR STEEL

COSTS AND DEMAND

The inelasticity of the total demand for steel and the aforementioned characteristics of cost in the steel industry place definite limitations on the financial ability of the industry to increase production by decreasing prices. Assuming that each 1 per cent decrease in price would increase consumption of steel 1 per cent, a 10 per cent decrease in the average level of steel prices prevailing during 1938 even though offset by a 10 per cent increase in the quantity of steel sold, would have increased the deficit[28] of the United States Steel Corporation from $8,758,572.00 to $52,058,572.00. This estimate is most conservative, since there is every indication that the elasticity of the demand for steel is not as great as assumed above.

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[27] In the case of United States Steel Corporation and its subsidiaries, the average cost of all operations per ton of steel shipped, under 1938 conditions, would be $55.73, plus an amount equal to $182,100,000 (the total "fixed" costs) divided by the number of tons produced.

Despite this overall price-volume-cost relationship in the industry, the potential elasticity of demand for the product of an individual steel company and the internal problems arising within individual companies from this characteristic cost pattern further affect the market for steel.

Except in periods of high operations, and more particularly in times of slack demand, there is a tendency to cut prices below average costs so long as the price for the additional unit sold is above the "additional" cost necessary to produce such additional ton of steel. The large size of individual orders and the potential shiftability of buyers of steel in response to price considerations accentuate such a tendency, particularly when, due to the inelastic nature of the total demand for steel, the problem for the individual producer is to obtain a share of the going business. Thus it is that in periods of restricted demand, knowing that anything above his "additional" costs contributes something toward "overhead" or "fixed" costs which must be met in any event, the producer will cut prices below his average costs if he feels he can obtain additional business for his mills thereby. This inherent tendency to cut prices, however, is offset to some extent by the knowledge that competitors will meet price concessions as soon as they become known.

PSYCHOLOGICAL FACTORS

Buyers and sellers of steel react differently at various stages of the business cycle; this is natural in an industry marked by large cyclical fluctuations in the demand for its products. In depression the tendency toward price cutting grows as buyers bargain more sharply and sellers scramble for what business there is in an effort to reduce deficits mounting under the burden of "overhead" or "fixed" costs. In better times buyers are less averse to paying higher prices, and sellers no longer under the goad of operating losses are reluctant to make price concessions. Therefore, in part at least, cyclical fluctuations in steel prices are attributable to changes in the psychology of buyers and sellers.

CHARACTERISTIC PATTERNS OF ACTION BY SELLERS IN THE MARKET FOR STEEL

The factors mentioned above have resulted in phenomena that reappear each time the steel industry passes through a full cycle in demand.[29]

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[28] Deficit after deduction of bond interest, but before Federal income and profit taxes and exclusive of non-operating income and expense.

[29] The pattern outlined has perhaps been oversimplified since (1) all products do not pass through each phase of the cycle simultaneously, making the pattern more confused than it appears in this outline; (2) the existence of jobbers and distributors complicates the situation with respect to certain products; (3) in addition, the human factor is unpredictable, making it difficult for businessmen always to rationalize their actions as they participate in a highly competitive market.

In a rising cycle as demand increases, average costs in the industry decrease as additional units are produced, but these decreases are usually soon offset by higher raw material prices, and increased labor and other costs. In addition, as already indicated, the psychology of the buyers and sellers changes and the industry may feel that the time is propitious for an increase in prices, not only to cover increased costs, but also to compensate for past losses and to accumulate resources for possible future periods of depression. Quite naturally, however, producers of steel do not care to take the risk of losing their share of business by an increase in prices which may not be followed by their competitors.[39] The natural result is that the industry is inclined to wait for some large producer to announce higher prices. This natural phenomenon in the rising cycle is sometimes called "price leadership." So long as the term is used to describe a natural phenomenon resulting from factors inherent in the industry and involving no collusion or other violation of the anti-trust laws, there is little objection to the term.

In the falling cycle, average costs increase as demand and production decrease, accentuated in part by the continuance of high wages which have a tendency to become inflexible, or in any event to lag in their adjustment to the lower level of production. In the early stages of the decline in demand, the industry, aware of the inflexibility of the total demand for steel and faced by rising average costs per unit of output, naturally is averse to cutting prices when the prices they are getting on the going business barely cover their costs. From past experience the industry is aware that any weakening of prices leads buyers to hold off purchasing in the expectation that prices will go still lower. Then too, the steel producer may be optimistic about an improvement in general business conditions in the near future. However, sporadic price cutting soon breaks out spurred by the individual producer's hope of obtaining an additional share of the going business. Concessions soon become general knowledge in the trade; and while, for a period, some producers may not care to compete on the basis of these concessions, eventually all producers must meet competition at the going prices.

THE BASING POINT METHOD OF QUOTING DELIVERED PRICES

The basing point method of quoting delivered prices in the steel industry has developed over a long period of years in response to the fundamental economic factors of that industry. Two authorities on the economics of the steel industry succintly point to the basic fallacy in the reasoning of most critics of this pricing method when they state that "Intelligent appreciation of the pricing problem in the steel industry has suffered from a failure of most commentators to distinguish between the basing point system as a medium or mere mechanism for the translation of policy into action and the economic roots of that primary policy itself."[31]

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[39] Does not apply where all capacity of a particular product is booked substantially ahead.

ECONOMIC ROOTS OF THE BASING POINT METHOD

In quoting prices manufacturers of steel must take certain basic factors into consideration: (1) The cost of transportation from steel mill to destination may be substantial in relation to the value of steel shipped. Consumers of steel are interested in the cost of steel at the place where they use it. Therefore, most consumers want to know the lowest delivered price at which they may purchase the steel they require. (2) Consumers of steel are located in different parts of the country and although more steel may be sold in some sections than in others, even major markets for the same steel product may be geographically widespread. (3) Producers of steel must locate their plants at points where raw materials may be economically assembled. This confines major steel producing centers to a few geographical areas. Modern steel making equipment is large and complex, it requires great capital investment and is extremely immobile once installed. (4) To insure economical and reasonably stable operations, steel producers must sell large quantities of steel and since consumers of the group of steel products that may economically be produced together may be located in different areas, the producer must be able to quote prices at diversified locations. The extent to which he may economically serve different consuming areas will be determined by the most economical combination of assembly costs of raw materials, production costs and the cost of delivering finished steel to important markets. (5) Producers of steel have large "fixed" costs, which must be met regardless of the number of tons produced so long as operations are continued. Although these producers realize that the total quantity of steel consumed cannot be greatly influenced by reductions in steel prices, they do know that the quotation of a delivered price only slightly below other quoted delivered prices may influence the placement of substantial orders with a particular producer. Since competition for available business is keen, and particularly so when low rates of operation make the "fixed" costs burdensome, a knowledge of the level at which competition must be met in quoting prices at a definite location is valuable in preventing completely disorganized markets that might prove disastrous to the industry.

The multiple basing point method of quoting delivered steel prices is a simple pricing medium which has evolved over a long period of time to meet the peculiar characteristics of the steel industry. It is an open price method of quoting delivered prices at diversified locations. Such open prices are similar to list prices which may be and are reduced to meet competition. As a pricing medium it permits the consumer to bargain with a number of producers for both steel and service at the lowest possible price and at the point where he needs it. It serves producers by permitting them to compete in diversified markets to obtain the volume and even flow of orders necessary to economical operations. In essence, it provides an orderly medium by means of which consumers and producers of steel may trade to their mutual benefit.

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[31] de Chazeau and Stratton, *Economics of the Iron and Steel Industry*, by Daugherty, de Chazeau and Stratton, p. 578 (McGraw-Hill Book Company, 1937).

Price Stabilization

Case IV–4: THE SULFUR INDUSTRY

The following excerpts are from the testimony of Dr. R. H. Montgomery, of the University of Texas, presented before the Temporary National Economic Committee on March 14, 1939.[1]

Importance of Sulfur and Sulfuric Acid

Dr. Montgomery: The best authority that I know in this field in the United States has made this simple statement, which I should like to read into the record, just one paragraph, and very short: "Sulfuric acid is the most basic of all chemical products. There is scarcely a manufactured product know in the preparation of which either of the raw material or in the actual process of making the article sulfuric acid does not play a part."

Acting Chairman Lubin: Will you quote the source of that statement, please?

Dr. Montgomery. From Theodore J. Kreps' book on sulfuric acid:[2] "Sulfuric acid, I believe, is the narrowest and at the same time most vital bottle neck of modern industry. I have a list here, which will be extended in the tables just submitted, indicating the importance in some of our basic industries."

Exhibit 1

SULFURIC ACID (EXPRESSED AS 50° B.) CONSUMED IN THE UNITED STATES, 1937, BY INDUSTRIES, IN SHORT TONS

Fertilizer	1,943,000	Paints and pigments	525,000
Petroleum refining	1,210,000	Explosives	230,000
Chemicals	1,060,000	Rayon and cellulose	380,000
Coal products	860,000	Textiles	112,000
Iron and steel	780,000	Miscellaneous	406,000
Other metallurgical	640,000		
			8,146,000

Colonel Chantland: Doctor, you have spoken of sulfuric acid, and we are talking about a sulfur study. Please relate those.

Dr. Montgomery: Over 70 per cent of the sulfuric acid of the United States is produced from natural sulfur or brimstone. Approximately 85 per cent of all of the sulfur produced in the United States is used in the manufacture of sulfuric acid.

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[1] *T.N.E.C. Hearings*, Part 5, pp. 1980 ff.

[2] *Economics of the Sulfuric Acid Industry* (Stanford, California: Stanford University Press, 1938).

Acting Chairman Lubin: Do you have any figures showing the trend of production of sulfuric acid from various sources, namely, whether or not more or less of sulfuric acid is being produced from sulfur direct?

Dr. Montgomery: Yes. The fertilizer industry took approximately 2,000,000 tons of sulfuric acid in 1937; petroleum refining, 1,200,000; chemicals, over 1,000,000 tons; coal products, iron and steel, metallurgical, paints and pigments each took over 500,000 tons. There are many others including the refining of gasoline, the manufacture of rayon, of cellulose film, most cotton textiles, explosives, which use large amounts, usually between 100,000 and 500,000 tons per year.

Sulfuric acid, and back of that brimstone, is probably the most vital single military product, or product to be used in war for war purposes. Every pound of smokeless powder manufactured requires 2.3 pounds of sulfuric acid, every pound of TNT requires 2.2 pounds of the acid, and every pound of picric acid requires 6.5 pounds of sulfuric acid.

. . . .

The Chairman: Have you testified as to how this sulfur is used, Dr. Montgomery?

Dr. Montgomery: I have. I entered an exhibit showing the entire, at least the major uses.

The Chairman: Is it used in its raw state? It has to be transposed into acid first.

Dr. Montgomery: I believe it is never used in its raw state. About 85 per cent of it is used as sulfuric acid. The other to various minor uses such as for medicinal purposes, but so far as the sulfur companies are concerned the sulfur is sold as it comes out of the ground; no processing whatever is involved to the sulfur company.

The Chairman: But so far as its commercial use is concerned, the sulfur content of commodities which are put upon the general market is comparatively small, is it not?

Dr. Montgomery: It depends on the commodity.

The Chairman: We will take fertilizer, for example.

Dr. Montgomery: In the case of superphosphate fertilizer almost 50 per cent of it is sulfuric acid. To 1,000 pounds of phosphate rock is added 900 pounds of sulfuric acid, and then a few minor factors, water, for instance, about 30 pounds, to make a ton of fertilizer. Now in some other cases, for instance in the production of steel and in the production of gasoline and in the production of cellulose film, much smaller amounts of sulfur are used.

The Chairman: Have you any idea as to what generalization could be made with respect to the over-all uses of sulfur?

Dr. Montgomery: Well, Senator, I do not believe any such average could be made at all, because certainly it would run from almost 50 per cent in the case of superphosphate fertilizer to almost zero in other cases.

Colonel Chantland: While in fertilizer the sulfuric acid is 50 per cent, or 1,000 pounds of phosphate rock to 900 pounds of sulfuric acid, how as to the matter of costs of the two, the rock and the sulfuric acid?

Dr. Montgomery: Of course, phosphate rock is very, very cheap, if stated in terms of tonnage, as contrasted with sulfuric acid.

Colonel Chantland: So that in the superphosphate fertilizer the sulfuric acid is a big element of cost?

Dr. Montgomery: It is so far as the materials going into the fertilizer are concerned; it is by far the most important. For instance, the phosphate rock sold on an average last year at $3.28 per ton.

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Sources, Production, and Methods of Producing Sulfur

The Chairman: What are the sources of the production of sulfur in its natural state?

Dr. Montgomery: There are primarily, throughout the past 40 years, two sources, one of them the Sicilian sulfur mines, where sulfur is mined very much as coal or iron is mined in this country, and deposits along the Gulf coast in Texas and Louisiana, where the sulfur is mined by the Frasch process, which I shall describe in just a moment.

. . . .

Now, to answer your question as to the source of American production, all of that comes from two States, Texas and Louisiana.

The Chairman: What is the extent of the deposits, the physical deposits?

Dr. Montgomery: That is very difficult to answer. Sulfur is found in its natural state in connection with what we know as the salt domes. There seem to be some 60 or 70 of those on the Gulf Coast. How many of them contain sulfur in commercial quantities is not known at present. At present there are only 6 plants producing sulfur

. . . .

The Frasch process, patented by Mr. Herman Frasch, a chemist for the Standard Oil Co. in 1891, involves the forcing of superheated steam, steam at approximately 220 and under tremendous pressure, approximately 6 atmospheres, into an inert deposit of natural sulfur or brimstone. The sulfur is melted and then is pumped out of the ground in a liquid form. The process was not immediately put into use when discovered by Mr. Frasch because of the difficulty of securing fuel for heating water and operating pumps.

In 1902 the discovery of oil at Spindle Top, Tex., near the then known sulfur deposit, gave him a cheap fuel. In 1903 the Union Sulphur Co. was reorganized to exploit that deposit, using the Frasch process, using crude oil as its fuel.

Until 1903 Union Sulphur Co. produced 85,000 tons. The next year 200,000 tons were produced. By 1908 about 800,000 tons per year were produced by that one company, and their production stayed at approximately that figure, sometimes going as high as 1,000,000 tons per year, until the dome was exhausted in 1924.

In 1906 the Anglo-Sicilian monopoly became tremendously excited about this new process of producing sulfur.

THE CHAIRMAN: Were the deposits in Sicily concentrated as they are in the United States?

DR. MONTGOMERY: Not by any means, Senator, and the Frasch process cannot be employed in Sicily at all on their deposits. The use of this process is determined by certain physical characteristics of the deposits. All of the known deposits which have been exploited by this method have been between 400 and 1,400 feet under the surface of the ground. In the Gulf coast area the sulfur deposit being found is a porous limestone rock formation with an overlay of several hundred feet of what we call sea mud. Essentially in using this process the surrounding ground must collapse the rock structure in order to permit the extraction of the melted sulfur in liquid form.

In 1906 the Italian Government sent a commission to Louisiana to study the process of extraction. That commission reported that Union Sulphur Co. could supply the American market at a cost of approximately 40 lire per long ton or about $7.72. In 1906 the Italian Government organized a consorzio a pool of all the sulfur producers in Sicily, and the next year an agreement was made by it with Union Sulphur Co., known as the Consortium of 1907.

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Between this Sicilian trust and the Union Sulphur an agreement as to European and American markets was made early in 1907.

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The substance of that contract is that the Export Corporation was given the North American market with the outlying islands and 50 per cent of the European market. The price at which sulfur was to be sold in the European market was determined by agreement between Consorzio and the Corporation.

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THE CHAIRMAN: Under the Webb-Pomerene Export Trade Act?

DR. MONTGOMERY: Yes.

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THE CHAIRMAN: Of course, the Webb-Pomerene Act was a statute passed by Congress which in effect repealed the antitrust law so far as foreign trade is concerned. In other words, corporations or persons were given the authority to make combinations in restraint of trade so far as export trade was concerned.

. . . .

COLONEL CHANTLAND: It was a question of meeting what they called the foreign cartels, where the Government did back them up, and the plea was that we couldn't do much against them unless we did something of that sort.

. . . .

DR. MONTGOMERY: From 1906 until 1913, the original Frasch patents apparently prohibited or prevented any other company from entering the field. The Freeport Sulphur Co. was organized in 1908. The Union Sulphur Co. immediately sued for infringement of patent. That suit was ultimately decided in 1919, at which time all of the patents were declared null and void by the Federal circuit court, Judge Buffington's decision, in the Philadelphia circuit.

In 1913 the Freeport Sulphur Co. began to produce. Within 2 or 3 years it was producing approximately half a million tons per year, a large enough volume to furnish real competition for Union in the American market. However, the war created a tremendous demand for sulfur. The use of sulfuric acid in the manufacture of explosives increased from approximately 150,000 tons pre-war to 2,700,000 in 1 year, 1918. The War Industries Board and the military authorities became interested in 1917 for fear we wouldn't have an adequate supply of sulfuric acid for war purposes. In 1918 they allocated the uses of sulfur, requiring both companies to keep at least half a million tons of sulfur above ground at their mines. In 1918 the Texas Gulf Sulphur Co. was organized, and in 1919 began production at Bryan Mound, which is one of the richest deposits that has been discovered up to the present time.

SULFUR PRICES

DR. MONTGOMERY: At the end of the war America's capacity to produce had been trebled. The depression, the slight depression of 1919 and the larger depression of 1920–21, reduced the demand for sulfur by more than 50 per cent.

Apparently a price war developed for approximately 1 year. The price of sulfur was reduced from $22 a ton, f.o.b. the mines, where it had been set by the War Industries Board in 1918, to $16.50 a ton, then $14.50, then $12.50 per ton. In that situation in 1922 the Sulphur Export Corporation was formed by the three companies then engaged in producing sulfur, Union Sulphur Co., of Louisiana; the Texas Gulf Sulphur Co., of Texas; and the Freeport Sulphur Co., of Texas.

. . . .

In 1924 Union Sulphur quit producing, having exhausted their deposits, but having a tremendous inventory of sulfur above ground continued to ship until 1928, at which time Union withdrew from the production of sulfur and from the Sulphur Export Corporation, selling its stock in the Sulphur Export Corporation to the other two companies on a 50–50 basis.

COLONEL CHANTLAND: What companies were those?

DR. MONTGOMERY: Freeport Sulphur Co. and the Texas Gulf Sulphur Co., the two companies agreeing to divide export business in the ratio of 50–50, where it has remained with minor exceptions to the present time.

Since 1924 Freeport Sulphur Co. and Texas Gulf Sulphur Co. have produced on an average over 94 per cent of the total production in the United States.

Mr. Ballinger: What happened to the price of sulfur at the time this corporation was formed; I mean, this export agreement was entered into?

Dr. Montgomery: The price of sulfur, which had declined very sharply, was raised to approximately $18 per ton f.o.b. the mines, and it has remained at approximately that figure—at exactly that figure—for some 10 years down to the present time.

Exhibit 2

SULPHUR AND PYRITE PRICES, 1922–37

	Sulphur Price at Mine	Import Pyrites Cents per Unit f.a.s. U.S. Ports		Sulphur Price at Mine	Import Pyrites Cents per Unit f.a.s. U.S. Ports
1922	$16.37	13	1930	$17.98	13
1923	16.06	12.25	1931	18.00	12
1924	16.26	12	1932	18.00	12
1925	15.61	11.5	1933	18.00	12
1926	17.99	12	1934	18.00	12
1927	18.48	12.75	1935	18.00	12
1928	18.00	13	1936	18.00	12
1929	17.97	13	1937	18.00	12

Colonel Chantland: You mean for the prime grade. There have been reductions for off-color and off-grade sulfur.

Mr. Ballinger: You mean $18 a ton for sulfur sold domestically in the United States?

Dr. Montgomery: Yes.

Mr. Ballinger: How about the price of sulfur sold abroad?

Dr. Montgomery: It has been figured apparently on the price of $18 per ton f.o.b. the mines plus freight, insurance, and other costs of shipment.

I should like to amend that statement in this way: It might be better to say that the export price of sulfur has been set, as it has, by agreement with the Sicilian producers.

(*Dr. Lubin assumed the Chair*)

Acting Chairman Lubin: You said a minute ago that under the agreement with the Sicilian producers, the markets of the world have been allocated between the American export group and the Sicilian producers, which means in effect, then, that this export price is applicable only in those limited markets, namely the North American continent and certain islands contiguous to the continent.

Dr. Montgomery. You mean that $18 per ton f.o.b. the mine? Yes. The prices to the foreign markets are, of course, affected by distance, difficulty of shipment, and things of that sort.

Acting Chairman Lubin: Under this agreement we have no foreign markets. I understood you to say the territory has been divided in such a way that the American producers have only the North American Continent and certain contiguous islands.

Dr. Montgomery: Not at all. We have supplied approximately 75 per cent of the world market outside of the North American continent. The North American Continent and the outlying islands are retained for the American producers exclusively, and most of the time, I believe with the exception of 1 year, the Italian market has been retained by the Sicilian producers, but the rest of the world market has been divided with the American producers supplying some 75 per cent of the world market.

. . . .

Dr. Montgomery: In addition there has been developed within the past 10 years a new process for extracting raw sulfur from pyrites. The patents on that process were obtained by a Norwegian company. For the past 5 years the Sulphur Export Corporation of the United States has allotted to the Norwegian company, Orkla Grube, A.B., usually referred to as Orkla, approximately 70,000 tons per year of its part of export or world-market sulfur.

Acting Chairman Lubin: May I interrupt at that point? Is that sulfur being produced under Norwegian patents being produced in the United States?

Dr. Montgomery: Not at all. The Texas Gulf Sulphur Co. holds the patent on that process for the United States, and I believe for the whole Western Hemisphere. The Texas Gulf Sulphur Co. has secured options on and leases on deposits from which sulfur may be produced, or which they think sulfur may be produced in both Newfoundland and Peru. I assume from that that they hold the patents on the process for the entire Western Hemisphere.

By this contract with Orkla, Orkla is effectively prevented from either expanding its own production or leasing patent rights to anyone else in the world outside of the Western Hemisphere.

Acting Chairman Lubin: This proportion of the output that has been allocated to Orkla, where is it being produced?

Dr. Montgomery: In Norway, and the allocation specifies that the sulfur is to be sold only in Scandinavia and Finland by Orkla.

Mr. Ballinger: Doctor, I would like to go back a little bit to the picture you have been drawing here for the committee. Following a rather vigorous price war in the sulfur industry, the companies entered into this export agreement?

Dr. Montgomery. That is correct.

Mr. Ballinger: And then the price of domestic sulfur was immediately raised—

Dr. Montgomery (*interposing*): That is correct.

Mr. Ballinger: And it stood stationary for how many years?

Dr. Montgomery: According to my records, for the past 17 years it has varied slightly for about 2 of those 17 years, being from 1926 down to October 1938. The price remained absolutely stationary at $18 per ton except for 2 years. In one of those years the price varied by 3 cents per ton from $18; in the other year it varied by 2 cents per ton.

Mr. Davis: Well, now, you stated that there has been a break in the price, or a sharp decline. What was the extent of that decline, and in what year did it occur?

Dr. Montgomery: In 1919 the price declined, the average price, for the best grade of sulfur, at the mine, about $2.50 per ton.

Colonel Chantland: The war price had been what?

Dr. Montgomery: Twenty-two dollars per ton. In 1925 the price again declined by approximately $2.50 per ton.

Mr. Davis: Declined from what price?

Dr. Montgomery: From $18 per ton f.o.b. the mine.

Mr. Davis: Well, now, that was subsequent to the approval of the original export trade agreement, was it not?

Dr. Montgomery: Yes; it was.

Mr. Davis: To what do you attribute that decline in 1925, if you have any knowledge or information?

Dr. Montgomery: I do not have knowledge from which I could state positively at all.

Mr. Davis. Well, now, when you refer to the price at the mine in different years mentioned, do you refer to the price to everybody, including American buyers as well as foreign buyers?

Dr. Montgomery: Whether foreign buyers get their sulfur at $18 f.o.b. the mine or not is impossible to state from the records. The price, however, does apply to their first quality of sulfur, the true yellow, pure sulfur, to all American buyers, regardless, apparently, of quantity or distance from the mine.

Mr. Tupper: Have we ever imported any sulfur?

Dr. Montgomery: We imported approximately one-third of world production until the opening of the Union Sulphur Co.'s mine in Louisiana. We were at that time importing approximately one-third of the total Sicilian production. Since 1906 our sulfur imports dropped, of course, immediately, to zero, or almost zero, where they have remained during the past 32 years.

Mr. Tupper: In this price war of 1921 there wasn't any problem of competition from abroad?

Dr. Montgomery: None whatever, so far as one can tell from the records.

. . . .

Mr. Blaisdell: As I understand it, there was a date shortly after the war when there was a severe price war in the industry.

Dr. Montgomery: Yes.

Mr. Blaisdell: At that time an agreement was made with the foreign producers which had the effect of stabilizing the price.

Dr. Montgomery: Yes; in my opinion, that is entirely correct.

Mr. Blaisdell: In 1925 again a similar situation arose in spite of the agreement.

DR. MONTGOMERY: Yes.

MR. BLAISDELL: A new agreement was then entered into which had essentially the same effect of reestablishing new terms of agreement.

DR. MONTGOMERY: So far as I know, there was no new agreement made in 1925 either between the Sulphur Export Corporation and the Sicilian producers or between the producers in this country. I consequently cannot state as of my own knowledge the reason for the stability of prices from 1925 to the present time. For some reason, the price of sulfur after that break in '25 became absolutely stationary. According to the report made by the Texas Gulf Sulphur Co. to the Federal Trade Commission on their request, during this investigation it has not varied a penny since '26.

MR. DAVIS: Dr. Montgomery, how long did the variation in prices in 1925 continue?

DR. MONTGOMERY: Apparently for 1 year only. During 1 year the break was great enough to pull the average for that year down by some $2.50 per ton.

MR. DAVIS: Do you not think that there was a natural fluctuation more or less following the World War of prices in this industry, just as there was in nearly all industries—becoming readjusted from war prices to a peacetime basis?

DR. MONTGOMERY: Yes; certainly; plus the fact that this industry, because of the entrance of a new company, Texas Gulf Sulphur Co., with the largest plant in the industry, with the largest plant the industry had ever known, plus the fact that the Freeport Sulphur Co. had more than doubled its production by opening a new mine, gave us a trebled production of sulfur as against pre-war years. That plus the business depression of 1920, '21, and the slight recession of '25 may be entirely responsible for the break in price which is indicated.

On the other hand, it might be pointed out that the business depression from 1929 down to 1939 has not had that effect. The price of sulfur has not been depressed during the past 10 years.

MR. DAVIS: Has it varied any during the past 10 years?

DR. MONTGOMERY: None whatsoever except 3 cents apparently 1 year and 2 cents 1 year.

COLONEL CHANTLAND: Up to what time.

DR. MONTGOMERY: Up to October 1938.

. . . .

COMPETING PRODUCTS

COLONEL CHANTLAND: Will the chairman bear with me while I bring out one other point that I think will be informative to the committee? That is this. Pyrite sulfur is spoken of sometimes as competitive. Will you express a judgment as to when, at what price level, it becomes competitive, and as to the matter of countries producing enough pyrites?

DR. MONTGOMERY: Sulfuric acid is produced from three, basically three, sources: The brimstone or raw sulfur, which accounts for approximately 70 per cent of the total; pyrites, iron pyrites usually, from which

15 to 20 per cent of the total—I mean within the United States—is produced; and 10 to 15 per cent produced from mining operations in zinc and copper. The price rigidity in pyrites parallels exactly the price rigidity in sulfur. In other words, during those 12 years in which there is no variation in price of sulfur there is no variation in the price of pyrites. Pyrites have to be approximately 12 cents per unit, a unit I believe is 22.4 pounds of 48 to 52 per cent sulfur pyrites, to compete with sulfur at $18 per ton in the manufacture of sulfuric acid. A price of $18 per ton for sulfur f.o.b. the mines is equivalent in competitive terms to a price of approximately 12 cents per unit for pyrites. This relationship in prices has been maintained for many years. Just how low the price of sulfur would have to be to induce the acid producers to change over from pyrites to sulfur I do not know. I should think it would be more accurate to say that the price of pyrites is determined by the price of sulfur.

. . . .

Cost of Producing Sulfur

Dr. Montgomery. I was asked earlier about the cost of producing sulfur in the United States under the Frasch process. In 1917, the Federal Trade Commission made two studies on cost of production. According to their study it was then costing Freeport Sulphur Co., $6.15 per ton; and Union Sulphur Co., $5.71 per ton. In 1927 and 1928, Freeport Sulphur Co. reported to Moody's Manual that their costs of production were $6.07 and $5.71 per ton. In their annual balance sheets, as reported in Moody's Manual, both Freeport and Texas Gulf from 1929 to 1938 have carried their inventory of sulfur above ground "at cost." I have divided this figure by the companies' reports of their sulfur inventory as of December 31 for each of the 10 years. According to this computation Freeport Sulphur Co.'s costs have varied from $5.64 to $6.79; a 10-year average of

Exhibit 3

SULPHUR COST OF PRODUCTION

	Freeport Sulphur Company	Texas Gulf Sulphur Company	Union Sulphur Company
1906			$7.72
1917	$6.15		5.71
1927	6.07		
1928	5.71		
1929	5.98	$5.27	
1930	6.79	5.77	
1931	6.17	5.75	
1932	6.15	6.11	
1933	5.64	6.22	
1934	6.51	5.52	
1935	6.23	5.54	
1936	5.77	5.43	
1937	5.93	5.18	

$6.13 per ton. Texas *Gulf Sulphur's costs have varied by this computation* from $5.18 per ton in 1937 to $6.22 per ton in 1933; for a 10-year average of $5.64 per ton. In my opinion these represent the best figures we have available on cost of production.

QUESTION

1. What factors accounted for the price policies of the sulfur industry in the years preceding 1938?

Case IV–5: INDUSTRIAL PRICING POLICIES IN PERIODS OF FULL EMPLOYMENT

At the Economic Institute on Pricing Problems and the Stabilization of Prosperity, conducted by the Chamber of Commerce of the United States in Washington, D.C., on September 18, 1947, Dr. E. S. Mason, of Harvard University, spoke on pricing policies of large industrial companies. Excerpts from his address, entitled "Competition, Price Policy, and High-Level Stability," follow.[1]

It should require no extended argument to demonstrate, nor statistical material to illustrate, the fact that the prices of industrial products are relatively stable. This is, of course, as true of the downswing of the cycle as it is of the upswing. Here we are concerned with the behavior of prices in the present period of more than full employment. It is not the prices of iron and steel, petroleum products, heavy chemicals, aluminum, glass or other items produced in the highly concentrated industrial sectors of the economy that have led the way in the present upswing of prices but rather grains, poultry and dairy products, textile fabrics, lumber and other items produced in what we are accustomed to call competitive markets. It is not the prices of motor cars as sold by the "big three" that have soared out of sight but rather the prices of so-called used cars sold on more competitive markets. And when the output of the concentrated industries has risen in price the cause of the rise in price is, as likely as not, to be found in substantial wage rate increases.

. . . .

Now why is it that the prices of goods in the heavily concentrated industrial sector of the economy are relatively stable or inflexible both in the upswing and the downswing of the cycle? It would be impossible to answer this question in satisfactory fashion without examining the structure of particular industrial markets but there are certain characteristics common to all or most of the industries here under considerations that go far toward explaining this phenomenon. Among these characteristics I should consider the following to have special importance: the tendency of variable costs per unit of output to be stable with respect to changes in the volume of output; the existence of possibilities of expanding sales through advertising or product changes without resort to price inducements; price policies which of necessity take account of the probable price reaction of rival firms; a traditional concern with anti-trust policy which forms part of the peculiar sensitiveness of large firms to adverse public reaction.

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[1] Reproduced by permission.

If you will permit this oversimplification, what we may think of as a typical industrial market situation is one in which three or four large firms account for a high percentage of the total sales of the industry, in which these firms enjoy some substantial opportunity to use non-price competitive techniques, a situation in which they typically regard their variable costs as constant with respect to output and finally a situation in which the firms are sensitive to the possibility of adverse public and legal action. In markets of this sort there is a strong tendency toward stability of prices over the cycle.

By way of contrast, in agriculture, in many branches of the textile industry, lumber and elsewhere the course of events during a cyclical upswing seems to be about as follows: an increase in demand leads to an increase in price which is almost immediate unless stocks are unusually large. The increase in prices is followed by an increase in output but at costs which soon begin to rise. Costs rise both because of a resort to higher cost sources to supply and because higher prices have to be paid to attract resources including labor into the industries in question. The sequence of events seems to run from demand to prices to costs. This sequence is well illustrated by the relationship between these variables in competitive fields of enterprise during the war.

In the area of large-scale enterprise, however, the sequence of cost-price relationships appears to run in the other direction. An increase in demand will be followed by an increase of output accompanied by no, or a very small, price increase. This situation may persist for an increase that carries output nearly to capacity operations depending largely on what happens to material prices or to wage rates. In the absence of substantial changes in material prices or wage rates, variable costs per unit of output remain constant or rise very slowly, and since overhead is spread over an increased volume average costs decrease and profits increase markedly. Under these circumstances the impetus to a price increase seems mainly to come from the costs side, i.e., from an increase in material prices or wage rates. The increase in material prices, in turn, is likely to be significant depending on whether these materials are produced under competitive conditions or in the large enterprise sector of the economy.

. . . .

In the markets now under discussion there is one or a small number of firms each so large, relative to the total market, that a variation in its volume of sales will have price effects that must be taken into account. How they are taken into account constitutes the core of what is customarily called price policy.

To have a price policy implies that the price at which a firm sells is not determined exclusively by market forces outside its own control. The possible courses of action open to the firm confronted by this situation are numerous. Recognizing that, under existing conditions, increased volume can not be obtained except by price reductions, the firm may try to change these conditions by increasing advertising expenditures. The firm may also attempt to increase sales without reducing prices by one or more of a large category of possible courses of action that are usually described as non-price competition. The term price policy, as I am using it here, embraces the whole range of devices by means of which the firm attempts to influence its volume of sales within the limits of the basic demand and cost conditions which lie outside its control.

Even if it is impossible to influence sales without resort to price changes it by no means follows that price changes will be made. In markets dominated by a small number of sellers any given firm, before changing its price, will have to take account of how its competitors are likely to react to this price change. If a price cut is met by rivals the firm may gain little volume and actually lose revenue by the price cut. If a price increase is not followed the firm may lose largely both in sales and revenue. Under these circumstances the firm may be well advised to leave its price unchanged.

This situation seems, in fact, to be typical of many industrial markets during most of the business cycle. In the absence of substantial change in material prices or wage rates the volume of sales can and does increase without any marked change in prices. A price increase is not necessary to induce increased volume since variable costs seem to be fairly constant with increasing volume pretty much to the limit of designed capacity. As output increases toward this limit no firm increases its price for fear its rivals will not follow. Likewise, as output falls, variable costs per unit are relatively unaffected. And no firm reduces its prices because a price cut is likely to be followed by all firms. Meanwhile a very active competition of a non-price variety may well be in process. Admittedly this is an oversimplification of the situation but it seems to hold true in many industrial markets.

The type of market structure that produces a high degree of price stability over the cycle is neither predominantly monopolistic nor predominantly competitive. It exhibits a blend of monopoly and competitive elements and it is the particular nature of this blend that results in the tendency toward price stability. If these markets were either more competitive or more monopolistic it seems likely that prices would respond more sensitively to changes in demand conditions than in fact they do. If they were more competitive the individual seller would not be concerned with the question whether his rivals would meet a price increase or decrease. If these markets were more monopolistic the firm would either have no rivals to take into account, or if there were rivals, responses to changed market conditions would be governed by understandings or agreements among the firms. As it is, there is sufficient monopoly influence in these markets to prevent price cutting when demand recedes. There is also enough competition both to resist price increases in response to increases in demand and to lead to an active cultivation of non-price forms of rivalry.

Up to this point we have discussed industrial price stability with reference to monopoly and competitive elements in the market. It would be unwise, however, to take leave of this subject without recognizing the substantial influence that public attitudes and public policy have on industrial prices. The large scale firm in the American economy is in a highly vulnerable political position. The antitrust mentality is deeply ingrained in the American people and the antitrust laws are merely a legislative embodiment of a profound suspicion of business size. The public reaction, therefore, to a rapid increase in industrial prices is apt to be very different than to a comparable rise in agricultural prices or in the prices of other products of small enterprise. The management of large firms, the leaders in particular industrial fields, are as well aware of this as anyone else, and the probable effect on public relations of a sizeable price increase is certainly taken into account. It would be difficult to explain the behavior of certain industrial prices at the present juncture without resorting to this kind of consideration. Certainly petroleum prices and the prices of a number of other products could be raised by the leading firms without any loss of business to rivals. That such prices are not raised is to be explained by semi-political considerations rather than by the economic elements of market structures. If anyone doubts the importance of this influence in the United States let him consider the behavior of industrial prices in a Latin American country, say Argentina or Brazil, in the face of the inflationary pressures that now impinge on this country.

Questions

1. By consulting the *Statistical Abstract of the United States* select three wholesale and three retail price series, for the years 1945–50 which display *relative* stability. From what you know of the industries concerned, why have these prices remained stable?
2. Select three wholesale and three retail series for the same period which have shown marked increases. In what respects do these industries vary from those selected in Question 1?
3. "In the absence of substantial changes in material prices or wage rates, variable costs per unit of output remain constant or rise very slowly; and since overhead is spread over an increased volume, average costs decrease and profits increase markedly." What conditions account for this sort of cost behavior in highly concentrated industry?

Price Cutting

Case IV–6: NASH-KELVINATOR CORPORATION[1]

During the early months of 1940 a major change in price structure occurred in the electric refrigerator industry. In the second week of

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[1] Materials for this case are derived from *T.N.E.C. Monograph No. 1* (76th Cong., 3d Sess.), *Price Behavior and Business Policy* (Washington, D.C.: Government Printing Office, 1940), pp. 109–64.

January the Nash-Kelvinator Corporation presented its 1940 models at prices which were substantially lower than its 1939 quotations. In the announcement accompanying these reductions, prominence was given to a 6-foot stripped model offered at a retail price of $119.95 delivered east of the Rocky Mountains. This was the lowest price ever quoted for a comparable model by any leading manufacturer utilizing the traditional wholesaler-retailer system of distribution. The other leading companies had earlier announced prices of $129–$134 for competing lines and the large mail-order companies quoted prices only slightly below $119.95 for their 6-foot stripped models.

This action by the Nash-Kelvinator Corporation precipitated a wave of similar reductions by competitors. General Motors, General Electric, and Westinghouse cut prices on comparable 6-foot stripped models to $114.75, delivered in the zone nearest their respective plants. In each case this involved substantial reductions below the prices which had been previously announced for 1940.

Companies which had been selling at levels below those of the "Big Five" also lowered prices. The Crosley Corporation reduced the price of its 6-foot stripped model and also cut the prices of its other models. Sears, Roebuck offered its 6-foot stripped model at $89.95 and reduced the price of its de luxe 6-foot model from $139.50 to $129.50.

To meet these new reductions, Nash-Kelvinator in turn announced another 6-foot stripped model for $114.75. Some of the other leading companies thereupon cut prices further to $112.75.

Changes in price structure were made simultaneously. The Nash-Kelvinator Corporation discarded its former zone system and sold refrigerators on a delivered basis anywhere east of the Rocky Mountains. The Norge division of the Norge-Warner Corporation offered an all-porcelain refrigerator at $159. 95, a price which was considerably below that of other all-porcelain models. The Philco Corporation presented a 7-foot refrigerator retailing at $119.95, instead of the usual 6-foot model. For most companies the widest price reductions were for the 6-foot model, which sold for between $112.75 and $114.75. On other 6-foot models and on 5-foot models reductions from 1939 prices were considerably less.

The electric refrigerator industry experienced its major growth in the two decades prior to 1940. In the experimental period, while the product was being developed, costs were high because of lack of standardization, coupled with a low aggregate volume of output. Prices were correspondingly high, and sales were confined to the limited group which could afford the luxury of experimentation. Gradually the product became relatively satisfactory, manufacturing methods were standardized, and prices fell in anticipation of, and partly as a result of, the introduction of mass production. The product passed out of the class of curiosity and obtained a wider market. Sales expanded rapidly, as more and more consumers realized the convenience and desirability of electric refrigeration.

Exhibit 1

AVERAGE RETAIL VALUE AND SALES OF ELECTRIC REFRIGERATORS, 1927–37

Year	Average Retail Value (Dollars)	Sales (Units)	Year	Average Retail Value (Dollars)	Sales (Units)
1927	350	375,000	1932	195	798,000
1929	292	778,000	1937	171	2,310,000

* Source: T N E C Monograph No. 1, p. 112

Exhibit 1 indicates that the period of most rapid price decline was from 1927 to 1932. The period of most rapid sales expansions, on the other hand, came from 1932 to 1937. Evidently, the stimulus to sales caused by the decline in price was somewhat delayed by the depression of 1929–32. After 1932, prices of refrigerators remained fairly stable to 1940.

Distribution of the product among families in the upper- and middle-income brackets reached a high level by 1937. Although the number of wired homes was also increasing in this period, the percentage of wired homes having electric refrigerators showed a marked rise. The market for refrigerators, as shown in Exhibit 2, was becoming saturated. One result of market saturation was evident in the different effects on sales volume experienced in two periods of business decline. The average number of units sold in 1932–33 was 17 per cent above the number sold in 1929, when saturation was only 9 per cent. Between 1937 and 1938, on the other hand, sales declined 46 per cent, starting from a saturation level in 1937 of 49 per cent.

In the downswing of the cycle from 1929 to 1932, price competition was especially severe. In 1931–32 a price war carried the retail price of some boxes to under $100 retail. From 1932 on, less attention was given to price, and more stress was placed upon the development of efficient, modern-styled equipment. Prices among companies were fairly uniform, and, in general, price competition was not emphasized. By 1938, prices quoted by the leading electric refrigerator manufacturers, with one important exception, had approached a degree of almost complete uniformity, as is shown by Exhibit 3. Altogether, the concerns listed in this exhibit controlled 80 per cent of the total sales of electric refrigerators. The one important exception to the pattern of price uniformity was the Coldspot refrigerator, produced by Sears, Roebuck.

Exhibit 2

PERCENTAGE OF WIRED HOMES
OWNING ELECTRIC
REFRIGERATORS, 1925-38

Year	Per Cent	Year	Per Cent
1925	*	1932	22
1926	2	1933	25
1927	4	1934	29
1928	6	1935	34
1929	9	1936	41
1930	13	1937	49
1931	17	1938	52

* Less than 1 per cent.
Source: *T.N.E.C. Monograph No. 1*, p. 118.

In the early period of expansion of the refrigerator industry new concerns entered the business freely. In the depression of 1929–32, which followed this period, high mortality occurred among the smaller companies. *The Electric Refrigerator News* in May, 1933, published a list of concerns which had ceased manufacturing electric refrigerators. Of 250 producers in the industry in 1932, only 75 remained in 1933; 110 had gone out of business, 41 could not be reached by mail, and 24 had been absorbed by other manufacturers. This high mortality reflected in part the stress of the depression for all business companies, but more particularly it foreshadowed the approaching maturity of the electric refrigerator industry, with a weeding-out of weaker firms. By 1937 the industry's production was concentrated largely in four companies, as indicated by Exhibit 4.

The corporations surviving the depression—especially the large firms—invested heavily in research and experimental activities. Modern sealed units for the refrigerant were introduced by the

Exhibit 3

LIST PRICES OF ELECTRIC REFRIGERATORS, PRINCIPAL COMPANIES, 1938*

Size (Cubic Feet)	Frigidaire	General Electric	Westinghouse	Kelvinator	Crosley	Leonard	Norge	Stewart Warner	Universal Cooler	Coldspot
3.0-3.9:										
Size	3.1		3.2	3.16	3.16	3.14	3.12			
Model	D3		HDS 32	K3 38	KB5 31	L3 38	R32 8			
Price	$119.50		$119.50	$118.95	$117.50	$118.95	$117.50			
4.0-4.9:										
Size	4.1	4	4.2	4.15	4.3	4.1	4.14	4.5		4.2
Model	N4 38	B 4	HDS 42	K4 38	KB5 43	L4 38	R41 8	458		3804
Price	$144.50	$144.50	$144.50	$142.95	$142.50	$142.95	$142.50	$141.75		$114.50
5.0-5.9:										
Size	5.1	5	5.2	5.16	5.07	5.12	5.15	5.64	5.25	
Model	Sp. 5 38	JB 5	HS 52	KS5 38	KB5 50	LS5 38	S52 8	550	AD 538	
Price	$164.50	$164.95	$169.50	$162.95	$162.50	$162.95	$162.50	$164.75	$164.95	
6.0-6.9:										
Size	6.1	6.1	6.2	6.13	6.0	6.09	6.15	6.3	6.51	6.3
Model	Sp. 6 38	JB 6	HS 62	KS6 38	KB5 60	LS6 38	S62 8	770	AD 658	3816
Price	$184.77	$184.75	$189.50	$182.95	$182.50	$182.95	$182.50	$179.75	$184.95	$169.50
7.0-7.9:										
Size	7.2	7.1	7.2	7.19	7.1	7.3	7.14		7.45	
Model	Sp. 7 38	JB 7	HS 72	KS7 38	KB5-71	LS7 38	S71 B		AD 758	
Price	$204.75	$204.75	$200.50	$202.95	$202.00	$202.95	$202.50		$204.95	
8.0-8.9:										
Size	8.25	8.1					8.11			8.6
Model	Ms 38	B 8					R81 8			3838
Price	$264.50	$264.50					$259.50			$179.50

* Prices are for lowest-priced comparable model in each size group.

Source: *Air Conditioning and Refrigeration News*, March 9, 1938, reprinted in *T.N.E.C. Monograph No. 1*, p. 162.

Exhibit 4

CONCENTRATION OF CONTROL OF MARKET FOR DOMESTIC ELECTRIC REFRIGERATORS, 1937

Capacity	First 4 Companies		Industry	
	Production	Per Cent of Total	Production	No. Companies
Under 6 feet:				
Number	754,130	69	1,093,026	21
Value	$48,464,364	69	$84,458,077	
6–10 feet:				
Number	728,660	74	991,022	
Value	$73,730,375	77	$95,985,895	25
10 feet and over:				
Number	*	*		
Value	$ 2,406,123	77	$ 3,130,046	14

* Data not available.

Source: *T.N.E.C. Monograph No. 1*, p. 163.

majority of manufacturers; streamlined refrigerator cabinets were perfected; economical methods of insulation were devised; and great advances were made in improving internal features of the refrigerator.

At the same time, sales effort was intensified, not only by manufacturers and dealers but also by public utilities, which sought to expand the demand for electric current. House-to-house canvassing and demonstrations of the product became a common practice. Manufacturers sought for and developed new markets. This required new distributors and more outlets. This movement toward the extension and expansion of distributive outlets was aided by established retail stores of various kinds. Furniture stores, hardware stores, music stores, automobile accessories shops, and department stores seized the opportunity to handle refrigerators. The largest group of outlets, however, was the electrical specialty stores.

Prior to 1931, most manufacturers presented relatively few models and styles. After business recovery began in the spring of 1933, the number of price lines increased. Instead of showing only three or four refrigerators, as was the case in 1929, by 1935 the average dealer was able to present to the prospective customer eight or ten distinct lines. After 1932, when efforts to expand the market were intensified, small 4-foot refrigerators were introduced to attract low-income consumers. Later the stripped model in the 6-foot box became the most popular size. This model was used especially in leader

Exhibit 5

DISTRIBUTIVE MARGIN FOR ELECTRIC REFRIGERATORS, 1928–37

Year	Estimated Average Factory Price	Estimated Average Retail Price	Margin		Year	Estimated Average Factory Price	Estimated Average Retail Price	Margin	
			Actual (On Retail)	Per Cent				Actual (On Retail)	Per Cent
1928	$166	$334	$168	50	1933	$83	$170	$87	51
1929	134	292	158	54	1934	84	172	88	51
1930	132	275	143	52	1935	78	166	88	53
1931	129	258	129	50	1936	81	164	83	51
1932	101	195	94	48	1937	85	173	88	51

Source: Factory price, National Electrical Manufacturers Association; retail price, *Air Conditioning and Refrigeration News*. Both sources quoted in *T.N.E.C. Monograph No. 1*, p. 144.

Exhibit 6

DISTRIBUTIVE MARGINS OF STANDARD BRAND SALES ORGANIZATION AND OF MASS DISTRIBUTOR, ELECTRIC REFRIGERATORS, 1938

Type of Distribution	Retail Price	Manufacturer's Cost	Cost of Distribution	
			Actual	Per Cent of Retail Price
Typical standard brand sales organization	$207.50	$ 93.34	$114.16	55.0
Mass distributor	158.00	100.00	58.00	36.7

Source: John L. Thomas, "Varying Functions in Distribution: Their Costs and Influences on Retail Prices," *Journal of Marketing*, July 1938, p. 56, quoted in *T.N.E.C. Monograph No. 1*, p. 145.

selling, where stores attempted to influence the consumer to buy de luxe models at higher prices.

Throughout this period, dealers' margins, as indicated in Exhibit 5, remained fairly constant percentagewise, but, with the decline in retail prices, the dollar margin dropped. But costs of distributing electric refrigerators remained at high levels. The one important exception to these high costs of distribution was marketing through mass distributors. In Exhibit 6 the distributive margins of regular channels and mass distributors are compared.

Up to 1938 replacement sales accounted for less than one-fifth of the total market. As sales expansion and market saturation proceeded, however, it became evident that the demand for electric refrigerators was coming increasingly from replacement (see Exhibit 7). Under these conditions, sales were influenced strongly by three factors: durability, obsolescence, and trade-in allowances. In Exhibit 8 the increasing durability of refrigerators is shown. Obsolescence as well as absolute durability was a determining factor in replacements; to some extent, owners of refrigerators were influenced to buy new models which had technical improvements, but the effect of this factor was much less than in the case of automobiles. Finally, the cost of making a replacement was determined not only by the price of a new product but also by the trade-in allowance granted by the dealer on the old piece of equipment. While the acceptance of trade-ins in the refrigerator market became increasingly common up to 1938, it had not reached the proportions found in the automobile market. Exhibit 9 shows the growth of trade-ins up to 1938.

Exhibit 7

REPLACEMENT SALES AS A PER CENT OF TOTAL SALES OF ELECTRIC REFRIGERATORS, TWO COMPANIES, 1929-38

Year	Company A	Company B	Year	Company A	Company B
1929	3		1934	9	7
1930	2		1935	10	10
1931	3		1936	13	14
1932	1	1	1937	15	16
1933	3	2	1938	19	18

Source: *T.N.E.C. Monograph No. 1*, p. 148.

Exhibit 8

ESTIMATED DURABILITY OF ELECTRIC REFRIGERATORS, 1920-38

Year of Manufacture	Life Expectancy, Years	Year of Manufacture	Life Expectancy, Years
1920	6	1930	13
1921	7	1931	13
1922	8	1932	13
1923	9	1933	13
1924	10	1934	14
1925	11	1935	14
1926	11	1936	14
1927	12	1937	15
1928	12	1938	15
1929	12		

Source: *T.N.E.C. Monograph No. 1*, p. 149. The life expectancy for each year is an average of data compiled from a sample study which was made by a large manufacturer of refrigerators.

It was clear by 1940 that the electric refrigerator industry had come to a critical turning point as a result of the increasing saturation of a substantial portion of its market, particularly in the more prosperous sector of the population. There was abundant evidence that the initial period of rapid technologic development, aggressive price reductions, and vigorous growth was rapidly approaching an end. The decision by Nash-Kelvinator to cut prices, in January, 1940, however, led to immediate resumption of price competition by the industry. Sales of electric refrigerators during the first quarter of 1940 totaled 814,000 boxes, as compared with 611,000 for the same period in 1939.

Accompanying the price reduction on the stripped model was a policy adopted by Nash-Kelvinator, advocating the sale of higher-priced models wherever possible. On March 27, 1940, the company addressed the following communication to its dealers:

Exhibit 9

CASH VALUE OF TRADE-INS, AS A PERCENTAGE OF LIST PRICE OF ELECTRIC REFRIGERATORS, 1933–37*

Year	7 foot	6 foot	5 foot	4 foot
1933	10.0	13.8	10.3	16.5
1934	11.0	17.9	16.6	18.5
1935	21.0	22.2	21.3	24.1
1936	23.0	24.2	24.7	25.5
1937	32.0	32.1	31.6	31.8

* Manufacturers' suggested retail delivered price, northeast zone.

Source: *National Market Index*, published by National Refrigerator Index Publishing Co., Inc.; quoted in *T.N.E.C. Monograph No. 1*, p. 164.

> Yes; the evidence is pouring in—and it proves the soundness of Kelvinator's 1940 program. Look at the chart showing the percentage of Kelvinator's sales by models and prices, and then compare these facts with your own sales. The evidence shows clearly that Kelvinator dealers are selling higher-priced merchandise.
>
> Those who sell Kelvinator have more than a selling plan . . . they have a working selling plan. And it is working because it was carefully planned months ago with logical and easy-to-sell step-ups between models. There are low-priced models for the vast low-income market . . . and beautiful, full-featured models (including the new "Moist-Master" controlled humidity system) specifically designed to get the rapidly growing replacement business. Throughout Kelvinator's line of sixes and eights the salesman can step up sales because plus features in each step offer visible and provable added value to the customer.
>
> 79.8 per cent of the Kelvinator volume is in refrigerators with the greatest margin, the greatest gross dollar sale. The average unit sales price is better than $160.00.

According to this advertisement, field reports received by the company up to March 19 showed that actual sales of the various models were in the following ratio:

Price	Model	Per Cent	Price	Model	Per Cen
$114.75	CSX-6	6.4	$179.95	S-8	7.3
124.95	SS-6	13.8	209.95	HD-6	8.1
139.95	S-6	30.3	209.95	R-8	4.1
169.95	HS-6	13.5	239.95	HD-8	4.0
179.95	R-6	12.5			

QUESTIONS

1. Was the policy of price cutting adopted by Nash-Kelvinator in the spring of 1940 a desirable one?
2. Would it have been desirable to make equal price reductions for all models in the line?
3. What effect had the other sales policies of the company?
4. In what way would the price policies appropriate to 1929 require adjustment to meet the conditions of 1940?

Differential Pricing

Case IV-7: AMERICAN AIRLINES, INC.

The years 1947 and 1948 were unprofitable ones for most air-line companies in the United States. In the former year, operating losses of sixteen domestic trunk-line carriers amounted to $21,023,721, and in 1948 losses were $3,288,977.[1] Although passenger traffic on the air lines held up much better than on competing forms of transportation, the passenger load factor[2] declined abruptly from almost 82 per cent in 1946 to less than 61 per cent in 1948 (see Exhibit 1). Actual volume of passenger traffic remained about the same. The decrease in load factor was caused by an increase in capacity, more route miles being flown with larger planes.

In the profitable war years it was possible for the domestic air-line companies to reduce basic fares to low levels. In response to an order of the Civil Aeronautics Board of March 3, 1943, the Big Four—American, Eastern, TWA, and United—adopted a system-wide uniform base rate of 5.5 cents per passenger mile. Believing that the postwar period would bring general expansion in capacity and revenues, many carriers made further reductions, until the general fare level dropped to 4.6 cents per passenger-mile in 1945. Failure of increased revenues to result from these fare reductions,

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[1] Civil Aeronautics Board, *Recurrent Reports of Financial Data; Trunk Line Domestic Air Mail Carriers 1948* (Washington, D.C.: Government Printing Office, 1949).

[2] Revenue passenger-miles divided by the number of seat miles flown.

Exhibit 1

REVENUE PASSENGER LOAD FACTORS, U.S. DOMESTIC TRUNK LINES, 1939–48

Carrier	Revenue Passenger Load Factors (Percentage)									
	Prewar Years			War Years				Postwar Years		
	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
Big Four										
American	64.64	66.71	69.37	74.17	88.18	89.08	89.93	81.58	70.11	60.62
Eastern	52.90	55.91	54.05	70.02	87.32	86.24	86.08	77.42	60.26	58.94
TWA	46.09	57.74	58.75	71.24	89.22	91.67	90.83	83.83	66.28	57.92
United	61.01	61.85	66.40	81.95	92.10	95.16	93.41	84.31	75.32	65.41
Average	58.21	61.27	63.11	74.59	89.32	91.27	90.27	81.82	68.38	60.04
Other carriers										
Capital	61.28	52.18	51.51	66.06	81.20	81.80	82.00	70.04	53.96	49.02
National	30.62	43.78	44.71	73.53	86.23	87.66	89.40	78.35	54.72	38.37
Northeast	38.86	46.38	37.94	35.94	50.19	60.44	74.47	65.75	61.24	48.03
Western	40.04	49.46	47.1[illegible]	62.43	84.65	88.60	87.05	72.14	61.98	54.50
Braniff	38.88	46.47	47.48	67.30	91.75	89.44	89.12	77.15	61.55	54.18
Chicago and Southern	58.00	43.08	58.01	62.20	88.92	82.55	79.30	70.23	58.65	56.34
Delta	49.45	52.28	44.50	73.[illegible]	88.08	90.73	84.01	71.58	60.66	52.08
Northwest	47.23	44.22	49.60	65.44	85.08	84.76	88.30	81.03	69.00	56.31
Colonial	41.64	51.72	57.14	65.21	80.33	78.91	81.32	72.00	61.45	61.07
Continental	35.07	42.61	53.70	68.[illegible]	86.30	87.50	77.21	67.34	55.14	50.37
Inland	22.54	29.94	26.66	30.32	65.94	68.26	72.08	61.80	64.62	58.08
Mid-Continent	38.47	30.18	37.17	45.86	64.42	77.40	75.77	72.50	61.87	58.42
Average	48.50	46.50	47.39	60.02	81.85	84.58	86.94	73.46	59.97	52.47
Industry average	56.21	57.88	59.08	72.11	87.21	89.37	88.16	78.81	65.71	58.42

Source: Data assembled from C. A. B., *Annual Airline Statistics and Recurrent Reports*, as presented in Frederick W. Gill and Gilbert L. Bates, *Airline Competition* (Boston: Graduate School of Business Administration, Harvard University, 1949), p. 538. Reproduced by permission.

together with rising costs of operation, led to a reversal of policy after 1945. By the spring of 1947 the Big Four filed for higher rates, which increased the base from 4.6 cents per mile to 5.1 cents per mile, a 10 per cent increase. Continuing financial losses led to another 10 per cent increase in fares in December, 1947. Despite these sharp increases in the price of air travel, losses continued, and a third round of increases was adopted by most carriers in the fall of 1948.

Although there was general agreement among the major air-line companies as to the desirability of these rate increases, some executives began to have misgivings about the continuing decline in load factors. As a result, there was increasing use of lower fares for special classes of traffic, and this served to reduce the average fare at which passengers were carried.[3]

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[3] Concerning this situation, Mr. W. A. Patterson, president, United Air Lines, testified before the Senate Committee on Interstate and Foreign Commerce, Washington, May 9, 1949, as follows: "There was disagreement among the airlines, with increasing trends toward lower fares and discounts. For a short period, United attempted to hold its long distance fares at a point higher than competition, but was unable to continue" (quoted in Frederick W. Gill and Gilbert L. Bates, *Airline Competition* [Boston: Graduate School of Business Administration, Harvard University, 1949], p. 480).

Special rates in the transportation industries were not new: for years the railroads had used them for excursion traffic, round-trip fares, and in other forms. Prior to the war the air-line industry also employed special rates, chiefly of three kinds: round-trip fares, discounts to government employees, and discounts to businessmen under the Universal Air Travel Plan. The latter plan was designed for regular business travelers and offered a 15 per cent discount over the basic one-way fares. The plan consisted in establishing an account with an air-line company, depositing the sum of $425 in the account, and drawing against the account, at discounts of 15 per cent, for ticket purchases. Periodically, the customer was billed for an amount to replenish the account. In addition to the three principal forms of special rates, there were some excursion rates, and in the winter of 1937–38 a "wives-free" plan was inaugurated to improve load factors. It was discontinued in the spring of 1938.

After the war there was opposition on the part of most companies to the restoration of special rates. In 1945 a 5 per cent round-trip rate was adopted but was discontinued by all carriers after being in effect only a month or two, as it was generally agreed that the high level of traffic at that time made rate concessions unneeded. Discounts for government employees and the Universal Air Travel Plan were not revived after the war.

In the summer of 1948, with decreasing load factors, the air-lines industry renewed discussion of the round-trip discount. At this time the American Airlines was opposed to reinstatement of the round-trip rate. The chairman of the board of American Airlines stated, with reference to the round-trip rate that, in his opinion, it was "an outmoded system of selling, one originally sponsored by the rail lines and adopted by the airlines foolishly without mature consideration of the problem. If we sell a one-way ticket for $100 and permit a discount of 10 per cent for round trip, the cost of the journey is $180. If we are willing to sell two tickets, to the same person, for $180, we are in favor of selling one to the same person for $90, for that permits us to advertise a lower fare level. . . . We are in favor of the railroads' maintaining their present practice for it gives us sales and advertising advantages."[4] Despite this expressed opposition to lower round-trip rates, American was forced by competition, on

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[4] Letter from Mr. C. R. Smith, chairman of the board, American Airlines, Inc., to Civil Aeronautics Board chairman, Joseph J. O'Connell, Jr., September 2, 1948 (quoted by Gill and Bates, *op. cit.*, pp. 469–70).

September 15, 1948, to offer 5 per cent discounts on round-trip fares.

In August, 1948, load factors on main routes of American Airlines were especially low on early days of the week. Load factors on Monday, Tuesday, and Wednesday flights ranged from 48 to 55 per cent. On September 13, therefore, with the approval of the C.A.B. for a three-month test, American Airlines introduced a family-fare plan. When one person bought a full-fare ticket for Monday, Tuesday, or Wednesday travel, other members of the immediate family could travel at half-fare. Travel under this plan reduced plane fares below first-class rail fares.

As a result of these special rates the first-of-the-week load factor rose above earlier levels, without bringing any decrease in traffic on other days of the week. The following operating data summarize these results:

	August, 1948	*October, 1948*
No. of M. T. and W.	14	12
Revenue pass. miles (M. T. W.)	51,979,000	55,223,000
Av. load factor (M. T. W.)	51%	65.5%
No. of Th. F. S. S	17	19
Rev. pass. miles (Th. F. S. S.)	81,380,000	82,876,000

Under the plan 6,896 group sales, involving 7,637 half-fare tickets had been made in October. Full-fare tickets under the family plan totaled 7,001,418 revenue passenger-miles, while half-fares amounted to 7,447,555 revenue passenger miles.[5]

The C.A.B. granted an extension of the trial period and, by June, 1949, ten of the sixteen domestic trunk lines had adopted the family discount. Not all carriers believed that this or other forms of special rates were desirable. In his *Annual Report to the Stockholders* for 1948, Mr. W. A. Patterson, president of United Air Lines stated: "Your company, while insistent that the product already was priced too low, had to meet competition. A 10 per cent premium fare on DC-6's was eliminated. A 5 per cent round-trip discount was adopted. Next came a 'family plan' under which members of a family could travel under reduced rates on the first three days of the week. The outcome of it all was a net increase of only 2 per cent in

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[5] Most domestic air lines showed a loss in total passenger traffic from August to October. For all air lines but American, passenger revenues declined from $25,000,000 in August to $23,700,000 in October, and revenue passenger-miles from 440,000,000 to 410,000,000. American's revenue per passenger-mile was 5.76 cents in August and 5.52 cents in October.

United's passenger revenues, or $5,000,000 per year less than the amount originally sought" (quoted by Gill and Bates, *op. cit.*, p. 413).

In addition to reduced fares for some classes of traffic, air lines generally adopted premium fares for traffic on the new DC-6's and Constellations, which were introduced in 1947. The practice of charging supplements was based on the greater speed and comfort of these types of aircraft. In the fall of 1948, however, American Airlines removed its premium charges, forcing competing lines also to remove their supplements.

QUESTIONS

1. Do the comparative operating data for August and October, 1948, demonstrate the desirability of the reduced family fare introduced by American Airlines? What other factors would you consider?
2. Do you agree with the position of the chairman of the board of American Airlines regarding the round-trip discount? What differences, if any, are there between reductions for round trips and reductions for family travel?
3. Generally, what conditions would justify lower rates for special classes of travel?

Case IV-8: STANDARD BRANDS, INC.[1]

On November 21, 1936, the Federal Trade Commission issued a complaint against Standard Brands, alleging that the respondent's scale of differential prices for bakers' yeast constituted illegal discrimination in price. The complaint was brought under Section 2 (a) of the Clayton Act, as amended (i.e., the Robinson-Patman Act).

Standard Brands was a consolidation of the former Fleischmann Company and a number of other companies in the food field. In 1936 it was the largest manufacturer of yeast in the United States, enjoying between 55 and 65 per cent of the total yeast business. It produced approximately 120,000,000 pounds annually, of which 10–12 per cent was foil yeast and the remainder was bakers' yeast. Among the largest competitors of the company were: Anheuser-Busch Co., St. Louis; National Grain Yeast Co., New York; Red Star Yeast Co., Milwaukee; Consumers' Yeast Co., San Francisco;

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[1] The facts contained in this case have been drawn chiefly from 29 F.T.C. 121 (1939).

and the Federal Yeast Co., Baltimore. Standard Brands operated six factories located, respectively, at: Peekskill, New York; Chicago; Pekin, Illinois; San Francisco; Sumner, Washington; and Washington, D.C.

Yeast, as used in baking bread, is a necessary leavening ingredient. A pound of yeast is required in the manufacture of from 75 to 125 pounds of bread, depending upon the particular type of dough.

The yeast, all of which was of like grade and quality, was manufactured daily at the company's six factories. Bakers' yeast was molded into 1-pound and ½-pound cakes, wrapped, and then packed in 50-pound cartons. Because of the perishable nature of the product, prompt delivery was essential, and, to accomplish this, the company maintained 444 agencies so located geographically throughout the country that the yeast would reach these agencies by common carrier within 24 hours after its manufacture. At the agencies there were refrigerated warehouses maintained exclusively for the storage of yeast. Here the yeast, still in 50-pound cartons, was placed upon company-owned trucks. Operating over 1,300 routes, this wagon distribution system brought the yeast to some 25,000 customers in all parts of the country. In addition to the so-called "personal delivery" sales of yeast to bakers, a small amount of bakers' yeast was shipped to customers by common carrier, and a still smaller amount was sold to grocers for resale.

In the delivery of the yeast, the driver-salesman was accustomed to take daily route sheets made up at the agency headquarters, call on customers named therein, leave the amount of yeast they required, and either collect the cash or take the customer's receipt according to his instructions. Charge customers who receipted for the yeast were billed directly by the agency at the end of the month. Driver-salesmen solicited business from new and reclaimed prospects, but other salesmen were employed by the company as solicitors to sell its products. Where the quantity to be delivered to a customer was less than 50 pounds, the original cartons were broken by the driver-salesman. With the exception of a few wholesale routes, yeast was delivered from the same truck to both large and small customers. Many of the routes operated from the agencies were exclusively bakery routes, while others, so-called "unified routes," covered yeast and other products sold by the company. There were also a number of routes devoted solely to grocery products.

In addition to bakers' yeast the company sold many other products which were grouped into two principal classes—bakery products and grocery products—as follows:

Bakery Products	*Grocery Products*
Bakers' yeast	Foil yeast
Bulk products (including arkady, diamalt, frozen eggs, and fermaloid)	Bulk products—tea
Package products (including Fleischmann Baking Powder and other leaveners)	Package products (including Royal Baking Powder, Dr. Price Baking Powder, desserts, coffee, and tea)

The company required no written contracts with its customers, and there were no commitments which could not be terminated by either party at will. However, as a general practice, customers who paid less than 25 cents per pound for yeast and who purchased all their requirements from the company were obligated to purchase definite quantities monthly, in order to secure the yeast at more favorable prices.

To assist customers in improving products made from yeast, the company maintained a research laboratory, where experiments were conducted. A corps of experts was also maintained for the purpose of visiting bakeries and rendering assistance to customers in overcoming difficulties encountered in the manufacture of bread and other bakery products. Merchandising counsellors from the company instructed customers in methods of displaying and selling goods. The company also conducted national advertising campaigns in periodicals and by radio to promote the increased consumption of bakers' bread, and it furnished advertising material to local bakers at cost to enable them to tie in with national advertising campaigns. The company maintained a school for bakers, giving free instruction to all customers interested. No extra charge by the company was made for any of these technical and promotional services.

Because of the company's large number of customers, its products were sold in practically every community in the United States. Among the customers of the company was the Great Atlantic and Pacific Tea Company, with 38 bakeries located east of the Rocky Mountains and with 14,000 retail stores located chiefly east of the Rocky Mountains. The annual output of bread by the A. and P. amounted to 446,000,000 pounds, and its yeast consumption approximated 5,000,000 pounds per year. Another customer of Standard Brands was the Continental Baking Co., with 78 bakeries located throughout the United States, whose yeast requirements also approximated 5,000,000 pounds per year. Other large customers included the General Baking Company, whose annual requirements were 4,000,000 pounds; Hathaway Bakeries, Inc., whose products were distributed throughout New England; and First National Stores, with 2,400 stores located in New England. There were also thousands of customers whose operations were entirely local.

For many years prior to the issuance of the Federal Trade Commission complaint Standard Brands had employed a scale of prices based on the number of pounds of yeast used per month by the purchaser. This scale is presented in Exhibit 1. The poundages on which the discount structure was based represented the *total* usage of yeast by the customer, which was not necessarily the same as the amount purchased from Standard Brands. Thus a bakery using 2,000 pounds of yeast per month, but purchasing only 1,000 pounds from Standard Brands, would nonetheless pay the 2,000-pound rate of 19 cents per pound for the 1,000 pounds rather than 20 cents per pound, which would be the 1,000-pound rate. The basing of quantity discounts on total consumption rather than on quantities actually purchased was claimed to be a custom in the trade from which Standard Brands could not easily depart.

Exhibit 1

PRICES OF BAKERS' YEAST SOLD BY STANDARD BRANDS, INC., 1936

Price Bracket	Pounds per Month	Price per Pound (Cents)	Effective Discount in Terms of 25¢ lb. Base Price (Per Cent)
1	1–149	25	
2	150–299	23	8
3	300–499	22	12
4	500–999	21	16
5	1,000–1,499	20	20
6	1,500–2,999	19	24
7	3,000–4,999	18	28
8	5,000–7,499	17	32
9	7,999–9,999	16	36
10	10,000–19,999	14½	42
11	50,000 and up	14	44

The company did not publish its price lists, and customers were not acquainted with the discount structure. Before any price was quoted at which a customer might purchase bakers' yeast from the company, the customer first was required to indicate what his monthly requirements would be.

Standard Brands followed the practice of selling to some customers at "off-scale" prices, when the customer's yeast requirements had dropped enough to place him in a higher bracket but when the company continued to sell at the former price. The largest customers, who purchased yeast off-scale at the 14-cent price, were granted this concession by the central office. Divisional managers were authorized to sell off-scale to smaller customers but never more than 2 or 3 cents off. About 16 per cent of the customers served by the company's agency at Minneapolis purchased at off-scale prices, while in the New York City area about 35 per cent of the customers in the 3,000–5,000-pound class paid less than the price scale of 18 cents per pound. The company continued this practice because, where a customer had been granted a certain price on the basis of a certain consumption, he might desert Standard Brands for another supplier if, when his volume dropped off, Standard Brands insisted on putting him into a higher-price bracket.

The company also determined prices of bakers' yeast to its customers on the basis of total consumption, irrespective of the number of individual deliveries. The A. and P., for example, had a total national consumption per month of the company's yeast ranging from 451,000 pounds for July, 1936, to 403,625 pounds for January, 1937. These amounts were delivered from the company's various agencies to thirty-seven bakeries in locations from Louisiana to Iowa and Maine, in quantities ranging from 30,400 pounds delivered at Pittsburgh in July, 1936, to 2,200 pounds delivered at New Orleans in September, 1936. At no individual bakery of this customer was as much as 50,000 pounds delivered in one month. For the quantities delivered to the respective bakeries, according to the scale shown in Exhibit 1, the prices to twenty-three of the bakeries would have been 14½ cents, to eight prices would have been 16 cents, to four 17 cents, to one 18 cents, and to one 19 cents. However, the A. and P. paid 15 cents per pound for all its yeast. The Federal Bakeries, Inc., with seventy-eight branches located over the entire country, consumed nationally in excess of 10,000 pounds and also purchased this yeast at a price of 15 cents per pound, although monthly deliveries to its respective branches did not exceed 200 pounds. Individual customers purchasing only 200 pounds per month would have been required to pay 23 cents per pound.

In order to justify the price differentials before the Federal Trade Commission, Standard Brands made certain studies of the costs of

Exhibit 2

AVERAGE MONTHLY COSTS OF SALE AND DELIVERY OF ALL PRODUCTS, STANDARD BRANDS, JANUARY-MARCH, 1937

Group Classification	*Average Monthly Costs*
Agency stockrooms	$ 34,295
Automobiles:	
Route selling and delivery	119,551
Solicitation	24,055
Service	107
Other usage at divisions and agencies	858
Agency delivery	323,390
Agency bakery merchandising	23,504
Agency grocery merchandising	32,162
Agency administration	182,507
Division stockrooms	17,404
Division bakery merchandising:	
Solicitation	32,108
Service	12,848
Division grocery merchandising	28,360
Division administration	147,346
Foreign commissions	298
Total	$978,793

distribution and sale of bakers' yeast. These studies were based on the company's experience during the months of January, February, and March, 1937.

Average actual monthly costs of sale and delivery of all products in this period are shown in Exhibit 2. Average monthly sales, by products, for this same period are shown in the first column of Exhibit 3. The *known* factors, therefore, were actual total costs for all products and sales by products. The company's methods of determining costs of sale and delivery for each price bracket of bakers' yeast involved two principal points of procedure, namely: (1) allocation of costs to separate products; and (2) allocation of the various elements of cost, apportioned to bakers' yeast, to the separate quantity-price brackets.

Allocation of costs to separate products, shown in Exhibit 3, was accomplished by applying certain predetermined percentages to average monthly dollar sales. The percentages thus applied were: yeast, 23 per cent; bulk products, 7.25 per cent; and package products, 11.3 per cent. This constituted the method for the apportionment and allocation of sales and delivery expenses to products, which had been in actual use by the company since 1932, several years prior to the enactment of the Robinson-Patman Act. The company stated that these percentages were "based, in part, on the company's experiences and, in part, on generally recognized costs of distribution of grocery and other products and, in the opinion of its financial officers, they provide for a fair and reasonable allocation of such costs." The commission noted that "nowhere in the respondents' cost study does it appear that any factual study has been made to determine the correctness of the percentages that have been applied to the dollar sales of the respective products whereby the costs of sale and delivery of these products have been determined in the form of lump-sum estimates." As a result of the allocation of costs shown in Exhibit 3, it was determined that total average monthly costs of sale and delivery of bakers' yeast were $330,792. This was for sales by personal delivery, which was the chief method of sale. This total was separated into the following components of direct and indirect costs:

Direct costs:	
Route selling and delivery	$ 78,140.38
Solicitation	103,366.39
Service	10,951.18
Total direct costs	$192,457.95
Indirect costs:	$138,334.27
Total costs applicable to sale and delivery of bakers' yeast	$330,792.22

The company's next step was to allocate the above costs to the groups of customers whose monthly purchases of bakers' yeast fell in the respective quantity-price brackets. The results are shown in Exhibit 4. Items of direct costs making up the total of $192,457.95 were allocated and applied to the respective quantity-price brackets by time studies and call studies. Route selling and delivery costs were apportioned according to the time for stops of the driver-salesmen and trucks at customers' premises as determined by stop-watch studies and collected data for six days. Solicitation costs were apportioned according to number of calls on customers by solicitors, foremen, and managers. Service costs were apportioned according to actual time spent in calling on customers by servicemen. Indirect costs were allocated to quantity-price brackets in the same proportions as total direct cost. Before transforming total direct and indirect costs into costs per pound, the company apportioned $3,316.26,

Exhibit 3

STANDARD BRANDS, ALLOCATION OF TOTAL FIELD COSTS OF SALE AND DELIVERY TO PRODUCTS

	Dollar Sales	Percentage Applied to Dollar Sales	Estimated Costs	Adjustment Factor (1.78% of Est. Costs)	Final Allocation to Products of Total Average Monthly Costs
Bakery products:					
Pound yeast:					
Personal delivery	$1,413,095	23.00	$325,012	$ 5,780	$330,792
Shipping sales	35,369	23.00	8,135	145	8,280
Sales to grocers	26,277	23.00	6,044	107	6,151
Bulk products	749,368	7.25	54,329	966	55,295
Package products	68,505	11.30	7,741	138	7,879
Total	$2,292,614		$401,261	$ 7,136	$408,397
Grocery products.					
Foil yeast	$ 710,391	23.00	$163,390	$ 2,906	$166,296
Bulk products	3,878	7.25	281	5	286
Package products	3,511,133	11.30	396,758	7,056	403,814
Total	$4,225,402		$560,429	$ 9,967	$570,396
Grand Total	$6,518,016		$961,690	$17,103	$978,793

Exhibit 4

STANDARD BRANDS, ALLOCATIONS OF COSTS TO QUANTITY-PRICE BRACKETS

Bracket No.	Route Selling and Delivery Costs	Solicitation Costs	Service Costs	Indirect Costs	Total Field Costs of Sale and Delivery	Bakery Consultants Costs	Total Costs Applied to Bakers' Yeast
1	$25,366	$32,570	$ 854	$ 42,256	$101,046	$ 45	$101,091
2	10,644	22,848	1,293	25,002	59,787	67	59,854
3	6,539	13,918	1,407	15,715	37,579	73	37,652
4	6,828	11,582	2,305	14,890	35,605	158	35,763
5	3,526	5,391	1,193	7,267	17,377	167	17,544
6	5,793	5,141	1,770	9,132	21,836	338	22,174
7	5,322	4,432	842	7,617	18,213	643	18,856
8	4,148	2,812	503	5,364	12,827	418	13,245
9	4,155	1,950	447	4,709	11,261	247	11,508
10	5,819	2,722	338	6,382	15,261	1,160	16,421
11							
Total	$78,140	$103,366	$10,952	$138,334	$330,792	$ 3,316	$334,108

Exhibit 5

STANDARD BRANDS, DETERMINATION OF COST PER POUND BY QUANTITY-PRICE BRACKETS

Bracket No.	Price per Pound (Cents)	Total Costs Applied to Bakers' Yeast	Pounds of Bakers' Yeast Sold through Personal Delivery Service*	Cost per Pound (Cents)	Reductions	
					In Cost from Cost for 25-Cent Bracket (Cents)	In Price from Price for 25-Cent Bracket (Cents)
1	25	$101,091	859,226	11.765	. . .	. . .
2	23	59,854	597,049	10.025	1.740	2.0
3	22	37,652	488,146	7.713	4.052	3.0
4	21	35,763	625,842	5.714	6.051	4.0
5	20	17,544	358,457	4.894	6.871	5.0
6	19	22,174	872,442	2.542	9.223	6.0
7	18	18,856	905,271	2.083	9.682	7.0
8	17	13,245	921,843	1.437	10.328	8.0
9	16	11,508	781,025	1.474	10.292	9.0
10	14½	16,421	1,782,121	0.921	10.844	10.5
11	14	. .				
Total		$334,108	8,191,422			

* Sales during month of January, 1937.

representing bakery consultants' salaries and expenses, to the quantity-price brackets on the basis of a time study. Total costs applied to each price bracket were then converted to costs per pound, as indicated on Exhibit 5, on the basis of a tabulation of all sales of bakers' yeast throughout the United States during January, 1937, in each price bracket.

It will be noted that the cost differentials per pound roughly parallel the price differentials. Exhibit 5 shows that, after the first step down in price, the cumulative decrease in cost per pound exceeded the cumulative decrease in price.

In determining unit costs of sale and delivery of bakers' yeast for each price bracket, Standard Brands excluded manufacturing costs, transportation costs, and home-office general administrative costs (including advertising).

QUESTIONS

1. From the viewpoint of Standard Brands, Inc., what factors made the differential price system shown in Exhibit 1 a desirable price policy?
2. Are there any reasons which might make the scale of differentials an undesirable price policy—aside from aspects of governmental regulation?
3. What characteristics of the market for bakers' yeast made it possible for Standard Brands to maintain a differential price structure? Do you believe it rested primarily on cost differentials?
4. Was the price scale of Exhibit 1 socially undesirable?

Part V

NONPRICE COMPETITION

THE METHODS of competition employed by business companies embrace numerous devices other than price reductions for increasing sales; these include such means as advertising, improvement of the product, use of brand names, and extension of services. These methods of attracting business are designated by economists as "nonprice competition." Alternatives to price competition are nowadays so generally employed by business companies that "to compete" has come to signify, frequently, to step up sales promotion, to improve product design or styling, or to render better services to customers. Price competition is not unknown, but in many industries it is one of the less important ways of attracting business.

MEANING OF NONPRICE COMPETITION

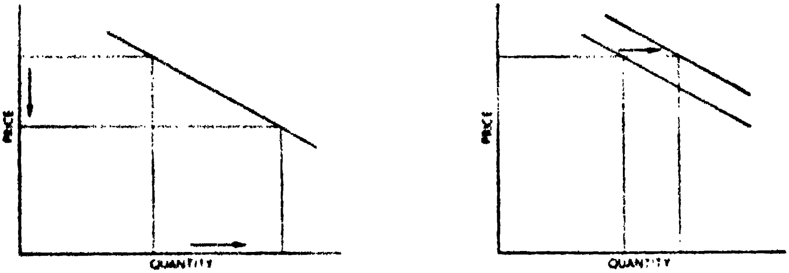
Price Competition versus Nonprice Competition

Companies which compete primarily on a price basis accept their demand curves as given and attempt to increase sales revenues by reducing prices and selling a greater quantity. There is no change in the demand curve; the firm merely operates at a lower point on the same curve, as indicated in Exhibit 1, *a*. Nonprice competition, on the other hand, is frequently directed toward creating sales through shifting the demand curve, as is shown in Exhibit 1, *b*. In advertising, for example, there is an attempt to sell more of the product at the same price (or more at any given price than could formerly be sold at that price). Nonprice competition, also, can be expressed through changing the product either by improving it or by deterioration. Through product variation a company hopes to bring a more favorable relationship between revenues and costs than could be achieved through retention of the same product, with or without price reduction.

In order to differentiate price competition from nonprice competition, we can distinguish three cases in which firms compete with one another: (1) pure competition, (2) monopolistic competition with firms competing on the basis of price, and (3) monopolistic

Exhibit 1

a, PRICE COMPETITION; *b*, NONPRICE COMPETITION (THROUGH ADVERTISING)



(*a*) (*b*)

competition with firms competing through nonprice methods. Paradoxically, in pure competition, firms do not compete on the basis of price because each is so small a factor in the market as to be unable to influence the market price. Each competitor accepts the market price and attempts to reduce his costs as much as possible in order to increase profits. In the process of doing this, he may be able to expand output and add further to his net revenues. Pure competition is, in a strict sense, a competition not of price but of cost and productive efficiency. On the other hand, through the effort to produce more efficiently, competitors, although commonly adopting the market price, exert a constant downward pressure on price. It is only in this sense that pure competition can be said to be price competition. The second case—that of monopolistic competition, with firms competing on the basis of price—is a more familiar one. The number of sellers is characteristically large enough to prevent serious injury to any one competitor when another cuts price. But, because of the imperfection of the market and the unlikelihood of direct retaliation, a price reduction often serves to attract considerable business. Retail trade affords a good example of this condition. The third case—monopolistic competition with firms competing through nonprice methods—describes what is probably the most typical situation in business today. Here the characteristics of the market (e.g., fewness of sellers) makes price competition unattractive. Nonaggressive price policies, such as the basing-point system, price leadership, and price stabilization, are favored. Some price competition survives, of course, but, in general, commercial rivalry is deflected into nonprice competition.

Causes of Nonprice Competition

Like price policies, policies of nonprice competition are conditioned by the structure of markets in which firms do business. Among the more important market forces is changing technology, which has greatly increased the complexity of products appearing on the market and which has necessitated such qualitative aspects of the sale as continuing availability of service and repair parts. In number alone, the products on the market today form a vast and diversified inventory to bid for the consumer's favor. By the same token the increase in number and technical complexity of products has made it more and more difficult for the consumer to form accurate judgments on the relative desirability of different products. Even industrial purchasing agents find it difficult to evaluate the increasing number of new products, such as synthetic fibers, alloys, and plastics. Some assistance is available to both industrial and final consumers from laboratories, but the reduction of all variations of quality and performance to terms of price is a practically impossible task. Consider, for example, the calculations which a manufacturer must make in choosing between alternate makes of machinery; these necessarily involve a multitude of variables, many of them based upon forecasts of future trends; the initial price may be only a very minor consideration.

Imperfect knowledge on the part of buyers has led sellers to spend money in giving information about their products, but, ordinarily, selling efforts have not stopped at this point The buyers' lack of knowledge of the product has also made it possible to differentiate the product through brand names, packaging, and design so that it is clearly distinguished (at least in the mind of the buyer) from other products. In the drug and cosmetic field, where consumers find it difficult to form objective judgments on products, these techniques have been used with special effectiveness. Sellers, aware that they can influence demand, employ advertising to reinforce the differentiation of product and to intensify demand.

Sellers have also turned to nonprice competition because of a desire to hold their present group of customers. A seller who depends on price appeal alone can retain his customers only so long as he continues to undersell competitors. Businessmen, therefore, adopt forms of competition which cannot be exactly duplicated by rival sellers. The conversion of Marshall Field's downstairs store in

1946 from a bargain basement, relying chiefly on price appeal, to a "budget floor" with complete assortments, private brands, and other features of nonprice competition, is an illustration of this form of competition.[1]

The decision to adopt nonprice measures of competition may be a voluntary one, but more often it is forced on the businessman by the nonprice competition of other firms. Formerly, the offering of free air by a gasoline service station attracted customers from other sellers. Today, not only free air but prompt cleaning of the windshield, filling of the radiator, and inspection of the battery are the minimum of service which the gasoline retailer must offer so as not to be at a competitive disadvantage. The mounting gross margin rate for department stores over the last twenty-five years is partially the result of involuntary competition in services.

A significant factor of market structure leading to nonprice competition is the widespread adoption of nonaggressive price policies, such as the basing-point system, price leadership, and price lining. Part IV has developed the conditions which lead to these price policies. Once established, these policies prevent sellers from competing in price. Competition is deflected to other avenues. The major cigarette companies do not compete in price, but huge advertising budgets indicate the intensity of nonprice competition.

Even if the alternative of price competition is open to a seller, it is often less appealing than nonprice competition because of his uncertainty as to the elasticity of demand and the reactions of competitors. A price cut might bring in greatly increased sales, but it might also cause his competitors to respond with price cuts. Moreover, if outlays on advertising are unsuccessful, he can retrench by stopping the campaign, but a price cut, once made, is withdrawn only with difficulty.

Finally, both federal and state governments have given strong encouragement to nonprice competition by legislation to prevent price cutting. In regulated industries, such as electric power and transportation, nonprice methods of attracting business are the chief means available. Resale price-maintenance laws, legalized by the Miller-Tydings Act as they relate to interstate commerce, have placed a price floor under many branded items, especially in the drug, cosmetic, book, liquor, appliance, and photographic equipment fields. The Robinson-Patman Act, which assures uniform prices to buyers of the same trade status, also encourages nonprice competition.

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[1] See Marshall Field and Co. case, p. 127.

TYPES OF NONPRICE COMPETITION

There are three principal forms assumed by nonprice competition: (1) variation in quality and style, (2) sales promotion, and (3) extension of services and other terms of trade. These methods of competition are sometimes alternatives; frequently they supplement one another.

Quality and Style Competition

In relatively few markets today are firms engaged in selling competing standardized products. This is especially true of final consumer goods. Competition in quality, style, and design is the most common form of nonprice competition.

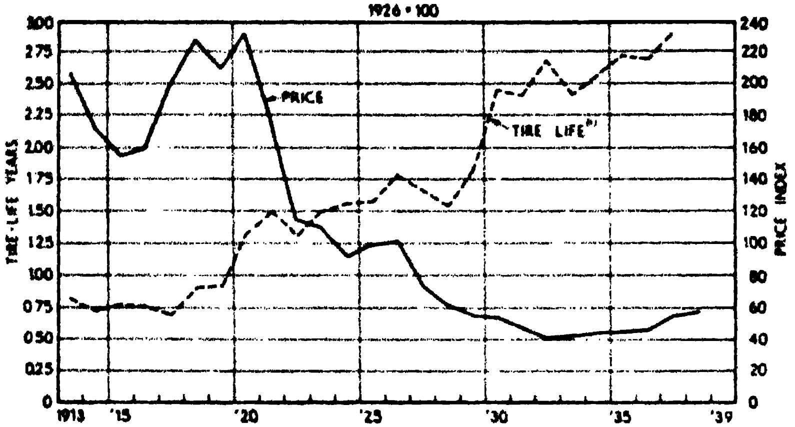
The concept of "quality" is by no means simple. It involves numerous variables, some of which can be measured; others are incapable of measurement. Any one product can involve several quality variables. An automobile, for example, can be appraised as to durability, gasoline consumption, probable frequency and cost of repairs, comfort, riding qualities, safety, and ease of handling. Some of these characteristics can be subdivided; thus cost of operation depends on the speed at which the car is driven and the roads over which it is used.

Competition in some industries has served to give the consumer substantial improvements over the years, and only part of the gain has been reflected in lower prices; the rest has gone for better quality. Exhibit 2 compares prices and service life of automobile tires in the years 1913–37. In this period average tire life in years tripled, and, since automobiles were being driven more miles per year at the end of the period, the indicated increase in durability was even greater. Economy of operation is another aspect of quality competition which can be measured approximately. According to tests made by the Procurement Division of the U.S. Treasury in 1931, the average consumption of five makes of 6-cubic-foot refrigerator was 44 kilowatt-hours per month. A test based on fourteen makes in 1938 showed average electricity consumption to have declined to 35 kilowatt-hours per month.[2] Improvements such as these

[2] *T.N.E.C. Monograph No. 1*, p. 64 (footnote).

Exhibit 2

WHOLESALE PRICES AND AVERAGE LIFE OF AUTOMOBILE TIRES, 1913-38



Source: T.N.E.C. Monograph No. 1, p. 65.

afford successive occasions for firms to engage in nonprice competition.

Although many quality changes are physically measurable in terms of performance, as a rule it is impossible to translate these changes into price equivalents.[3] Where quality changes are of the intangible sort involving design, taste, and style, not even measures of physical performance are available. Yet these intangible elements are often the chief determinants of consumer choice. In women's clothing, for example, the indefinable element of style is far more important than is thread count or tensile strength of the cloth or quality of workmanship. The success of a new model of automobile is determined more by the design of the hood than by the efficiency of the motor.

The degree to which quality competition emphasizes measurable elements of the product varies with commodities. Where industrial buyers constitute the chief market, there is a tendency to stress such features as operating economy, tensile strength, and durability. In consumer-goods markets sellers find it desirable to emphasize the intangible elements of quality, style, and design because these are

[3] Mr. Andrew T. Court made an interesting attempt to develop a price index for automobiles which would reflect changes not only in price but also in weight, wheel base, and horsepower expressed in terms of price (cf. *Dynamics of Automobile Demand* [New York: General Motors Corporation, 1939], pp. 99–117).

less easily copied. Sellers of food products seldom mention their conformity with government standards of quality; sellers of dresses do not usually emphasize fiber content; and distributors of cosmetics do not ordinarily refer to the quality of ingredients in their products. Flavor, style, and attractive containers are more important selling features.

The practice of selling goods at generally adopted price lines is a reflection of the basic competition in quality, rather than price, which prevails in some industries. Although price lining extends to many markets at wholesale and retail, it is almost universal in the apparel industry. In women's dresses, for example, the following wholesale prices have become established through habit and tradition:

\$1.87½ each	\$10.75 each	4.75 each	\$19.75 each
2.25 ″	12.75 ″	6.75 ″	22.75 ″
2.87½ ″	14.75 ″	7.75 ″	29.75 ″
3.75 ″	16.75 ″	8.75 ″	39.75 and over

Rarely, if ever, are these prices subject to modification by bargaining. Competition among manufacturers producing for the \$6.75 dress market centers not on price but upon quality of materials, workmanship, and especially upon style. Buyers, in turn, accept these price lines and concentrate attention on getting the best values at each of the recognized price levels. In retail markets there is a similar, if less defined, clustering of prices at certain major price lines. The U.S. Bureau of Labor Statistics, in reporting 114 quotations from 32 cities for women's medium-quality, woven elastic girdles, showed the following distribution of price frequencies on June 15, 1938:

Price	*No. of Quotations*	*Price*	*No. of Quotations*
\$2.95	4	\$4.00	1
2.98	2	4.69	1
3.39	1	5.00	67
3.50	32	5.50	2
3.59	1		
3.95	2	Total	114
3.98	1		

Similar concentration of retail prices at a few price lines is evident in other types of merchandise. Prior to the war, the retail prices of vacuum cleaners, for example, were usually spaced at intervals of \$10.00 from \$39.95 to \$79.95.[4] For some products, price lines are preserved by modifying quantity rather than quality of the product. The usual price lines, dictated by customer convenience, of 5 and 10 cents for chocolate candy bars led one large manufacturer to adjust the weight of his products, as indicated in Exhibit 3 in the period 1926–32.[5]

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[4] *T.N.E.C. Monograph No. 1*, pp. 70–71.

Exhibit 3

CHANGES IN SIZE OF CHOCOLATE CANDY BARS, 1926–32

DATE OF CHANGE	NET WEIGHT PER BAR (OUNCES)			
	Plain		Almond	
	5 Cents Retail	10 Cents Retail	5 Cents Retail	10 Cents Retail
Jan. 1, 1926	1⅜	2¼	1	2
Apr. 1, 1930	1⅝	2¾	1¼	2½
Oct. 10, 1931	2	4	1⅜	3¼
Sept. 2, 1932	1¾	4	1⅜	3
Nov. 4, 1932	1⅝	3⅝	1¼	3

Source: *T.N.E.C. Monograph No. 1*, p. 73.

Sales Promotion

As an alternative to varying the product, many business companies compete by incurring selling expenses which are directed primarily at creating demand. Collectively, these expenditures can be called "Sales promotion." Among the most spectacular is advertising, which involves outlays for newspaper and magazine publicity, direct mail, catalogues, radio programs, window displays, and packaging.[6] The basic characteristic of these expenditures is that they are undertaken with a view to influencing the buyer, though some changes of the physical form of the product, as in packaging, may also be involved. Obviously, in some cases it is difficult to distinguish changes in the product expressly designed for their effect on the consumer from those which have substantive utility. Who is to say whether a catsup bottle which is conveniently designed for table use may not also be the one whose contours catch the consumer's eye on the supermarket shelf?

Related to advertising is the use of trade-marks and brand names.

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[5] *Ibid.*, p. 73.

[6] In 1947, expenditures on advertising totaled nearly $4 billion, of which $1,222 million went for newspaper advertising, $531 million for radio, $493 million for magazines, $483 million for direct mail, and $1,151 million for all other media (Hans Zeisel, "1947 U.S. Advertising Volume Sets New Record," *Printers' Ink*, April 30, 1948, p. 29).

The purpose of these is to furnish an easy means of identifying a particular seller's product. It is conceivable that brands might be employed merely to enable the buyer to identify products embodying certain measurable quality differences. But usually sellers combine the use of brands with advertising, which attempts to persuade buyers that the product has certain desirable intangible characteristics which are unique or which it possesses in greater degree than competing goods. The brand is built into a limited monopoly with a regular following created by advertising.

The effectiveness with which trade-marks and brands can protect a product against price competition varies with different lines of goods. In fields in which comparisons are relatively simple or in markets where buyers are well equipped technically (as in many industrial-goods markets), there is a strong tendency for buyers to switch to competing brands as soon as substantial price differences appear. On the other hand, where the consumer is unable to compare rival brands intelligently, the effective use of brands and trademarks frequently permits wide price differentials to be maintained between virtually identical products. The lack of correspondence between price and U.S. Department of Agriculture grades for three food products is shown in Exhibit 4. In the case of grocery products, the element of taste is so subjective that comparisons among brands are very difficult, and, as a result, sellers are presented with an opportunity to create demand through nonprice competition. Similar situations exist in many other lines. A Federal Trade Commission investigation revealed that the Goodyear Tire and Rubber Company sold tires to Sears, Roebuck under the brand name "All State" which were of the same quality as those marketed by Goodyear under its own "All Weather" brand. The difference in wholesale prices between these two brands ranged from 29 to 40 per cent in the period 1927–33. At retail, All State tires were sold at prices 20 to 25 per cent below those of All Weather tires.[7] The most striking illustration of the insulation from price competition afforded by brand names is in the drug and cosmetic field. The consumer is almost completely uninformed as to the merits of rival products; few are aware of the significance of specifications of the United States Pharmacopeia. Here patent medicine advertising has free rein.

Where brands are "fair-traded" under the resale price-maintenance laws, price competition is effectively ruled out. In these

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[7] Federal Trade Commission, Docket No. 2116.

Exhibit 4

PRICES AND QUALITY GRADES FOR CANNED BEANS, PEARS, AND TOMATO JUICE

Brand	Price per Pound	Quality Grade	Brand	Price per Pound	Quality Grade
			Green and Wax Beans		
A. & P.	$0.13	A	Iona	$0.11	C
Asco	0.14	B	Premier (wax)	0.16	B
Blue Label	0.10	A	Shrivers	0.13	B
Blue Ridge	0.08	C	Stokely	0.11 0.13	C B
Crown of Maryland	0.08	C	Sweetheart	0.25	A
Farmdale	0.11	C	Torsch's	0.18	C
Fort	0.15	B	White Rose (wax)	0.17	B
			Bartlett Pears		
Approval	$0.10	B	Libby	$0.13	C
Asco	0.11	A	Lyric	0.10	C
Blue Label	0.16	B	Mission	0.09	C
D. G. S	0.18	C	Premier	0.12	B
Del Monte	0.13	B	Ray Crest	0.13	C
De Mand	0.15	C	S. & W	0.20	C, A
Hunt	0.14	A	White Rose	0.20	B
Iona	0.10	C			
			Tomato Juice		
Alice	$0.096	A (86)*	Le Grande	$0.101	C (78)
Ann Page	0.096	A (94)	Libby	0.096	A (89)
Approval	0.083	D (65)	Phillips	0.076	C (78)
Asco	0.080	A (90)	Ritter	0.075	A (87)
Beech-Nut	0.118	A (90)	Scott	0.057	A (92)
Campbell	0.096	A (92)	Stokely	0.087	A (93)
College Inn	0.099	A (90)	Webster	0.072	A (96)
Blackwell & Crosse	0.108	C (84)	Welch	0.15	A (94)
Heinz's	0.106	A (94)	White Rose	0.118	C (82)

* Number in parentheses is the numerical grade.

Source: *Hearing before the Committee on Coinage, Weights, and Measures, U.S. House of Representatives on H.R. [illegible], Standard Metal Container Act of 1937, March 15–16, 1938*, pp. 20–21. Reproduced in *T.N.E.C. Monograph No. 1*, p. 77.

situations competition, when it exists, must necessarily be in advertising, service, and other nonprice forms. To some extent private brands supply alternatives on which price competition can take place, but these are not universally available, nor do they constitute complete substitutes for well-advertised brands which have been "fair-traded."

Other devices of sales promotion include personal selling, free distribution of samples of the product, give-away contests (which have gained such great popularity in recent years), and other methods, such as the use of coupons exchangeable for other products. With regard to personal selling, it should be noted that some use of salesmen's time is for "production," such as making estimates, giving instruction in the use of the product, handling complaints, and making collections. But it cannot be doubted that the chief use of salesmen is for promotion of demand for the product. As such, personal selling is an alternative or supplement to other means of sales promotion.

Competition in Services and Other Terms of Trade

In the introduction to differential pricing in Part IV emphasis was placed primarily on differences in the conditions of sale, such as discounts and freight allowances, which could be directly translated into terms of price.[8] There are many terms of trade and collateral services, however, which cannot easily be commuted into price differences. The increased resort to nonprice competition has led many sellers to use "escape devices" in order to attract trade. A comprehensive list of these methods of modifying the terms of sale is presented in the appendix to this introduction.[9] It will be observed that a few of these concessions, especially those in the first group, can be directly expressed in price terms.

The inability of businessmen to compete in price because of legal barriers has frequently led to ingenious methods of nonprice competition. Under the N.R.A., when prices were controlled by code provisions, a retail druggist in California, unable to cut prices, employed a medium to give free psychic readings to his customers. An automobile dealer was accused of price cutting because he bought six suits of clothes from a tailor to whom he sold a car.[10] In many cases, of course, the services form an integral and necessary part of the sales transaction. The purchaser of an automobile or household appliance reasonably looks to the manufacturer to maintain adequate facilities for repair and replacement of parts. The conscientious effort made by many sellers of technical goods to supply continuing service for their products bespeaks the importance of this form of nonprice competition. It is to be clearly distinguished from the proliferation of unwanted services, which exists in some fields.

EFFECTS OF NONPRICE COMPETITION

The results of competition through other means than price can be considered from the standpoint of (1) the business company which employs these methods and (2) the consumer whose welfare is affected by the shift to nonprice competition. The point of view of this book is primarily that of the business company; however, no business policies can be adjudged sound in the long run if they are basically detrimental to the interest of the consumer—hence the need for considering the effect of business policies on the latter.

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[8] Cf. p. 248–49.

[9] Cf. pp. 353 ff.

[10] *T.N.E.C. Monograph No. 1*, p. 56.

Effects on Business Companies

The use of nonprice competition protects the seller to some extent against price cuts made by competitors. Where the independence achieved in this way is considerable, a company may enjoy higher than normal profits. Industries in which sales promotion expenditures are significant have, as is indicated by Exhibit 5, experienced larger profits than the average of industrial companies.[11] Nonprice competition can also bring direct benefits to the firm in larger volume of sales. Under many circumstances this greater output can be produced at lower unit costs, which increases profits more than proportionally on the additional units. As a defensive measure, nonprice competition may also be preferable to price cuts because customers who might be attracted to competitors by price cuts are more likely to remain securely with a seller who differentiates his product either

Exhibit 5

PROFITS OF INDUSTRIAL GROUPS USING LARGE AMOUNTS OF ADVERTISING, 1919-28

Industrial Groups	No. of Corporations	Profit as a Percentage of Capitalization (1919-28)
Toilet preparations	9	31.6
Proprietary preparations	56	20.8
Confectionery	21	17.8
Bakery products	17	16.8
Package foods	19	16.2
Tobacco	23	14.2
Canned goods	16	13.8
Beverages	11	3.8
Meat packing	23	1.9
All manufacturing	2,046	10.8

Source: R. C. Epstein, *Industrial Profits in the United States* (New York: National Bureau of Economic Research, Inc., 1934), pp. 242 ff., as reprinted in Arthur R. Burns, *Decline of Competition* (New York: McGraw-Hill Book Co., Inc., 1936), p. 392.

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[11] The causal relationship may be the other way around in some cases; firms may spend more on advertising because they have had a favorable profit experience.

by qualitative differences or by service or advertising. Nonprice competition, in other words, is a superior method of retaining customer good-will. Where sales promotion is used skillfully it is capable of reducing seasonal fluctuations in sales and stabilizing production and employment. The Procter and Gamble Company claims that its operations have been stabilized in this way. On the other hand, some retail sales promotion appears to accentuate sales peaks, as in the case of department-store trade at Christmas and Easter. Companies which have become well known through sales promotion also find certain collateral advantages of operation, such as easier procurement of personnel and facilitated sale of securities.

Sales promotion is not without disadvantages to the company employing it. Large advertising budgets are in the nature of recurring cash outlays which must be sustained to prevent sales from falling. A substantial amount of advertising must be looked on as the competitive burden of maintaining a share of the market, not of enlarging it. The institution of style cycles and annual model changes in some industries leaves firms in a precarious position where each new season presents a gamble. In the automobile industry, for example, there have been marked differences in the competitive success of yearly models. Companies which resort to nonprice competition expose themselves frequently to nonassessable risks. On the whole, however, businessmen appear to prefer these risks to those of price competition.

Effects on the Consumer

Much of the foregoing discussion has indicated the effects of nonprice competition on the consumer. In some cases there seems to be little doubt that he has been benefited by competition in quality. The improvements in many technical products, such as automobiles, radios, and home appliances, over the last three decades are obviously advantageous to the consumer, and these changes have been brought chiefly by competition in quality. Although less evident, the improvement of industrial goods, such as structural steel, chemicals, and electronic devices, has also contributed materially to improving production processes and products. The focusing of style competition on a relatively small number of price lines in the apparel trades has likewise had many advantages, reducing the costs of carrying inventories, reducing selling time at wholesale and retail levels, and simplifying the problem of selection for the final consumer. In some cases, but not all, sales promotion has stimulated demand to such an extent that, with declining costs of production, the product has become available at a lower price to consumers. (The exact results of sales promotion depend on the shape of the demand and cost curves and on the effects of transference of demand and resources from other industries.) It is possible, moreover, to count as benefits the incidental advantages which sales promotion offers, such as radio entertainment, a cheap press, and certain "free" services. None of them, of course, is to be regarded as a *net* gain, and all could probably be more cheaply gotten by direct rather than by indirect expenditure by consumers.

Conclusion

The disadvantages of nonprice competition have been strongly emphasized, if not overemphasized, by many critics. If the cost of securing a product which is sold through nonprice competition (such as advertising) be compared with the cost of producing it under pure competition, where, by definition, there could be no advertising, it may be more costly to produce the product under nonprice competition. But, as has been indicated in earlier parts of this volume, the rarity of pure competition among actual market structures makes this comparison of little practical importance. Given the degree of imperfection which seems an essential characteristic of most markets, the question is: Does nonprice competition necessarily increase prices to the consumer? Where there is no net expansion of market demand and where firms are engaged in competitive advertising, it seems clear that prices will be increased by nonprice competition. This result certainly follows where nonprice competition takes the form of sales promotion. The judgment on quality and style competition is more difficult because it involves some determination of how many styles and how much differentiation of product consumers really want In the absence of more objective criteria, it must be concluded that they want as much as they are willing to pay for under conditions of adequate information about alternatives (e.g., under these conditions a consumer might choose between a brand-name tomato juice at 15 cents per can and U.S. grade A tomato juice at 13 cents per can).

Perhaps the strongest objection to nonprice competition is that, as more expensive improved products are placed on the market, the lower-priced stripped models frequently disappear. Despite great competition in technical quality of automobiles, they have not come down in price. A partial answer to this objection is that, in durable goods at least, the secondhand market satisfies the needs of those who want lower-priced products. Another objection is that advertising has in some cases been used to mislead consumers; but in accuracy it must be acknowledged that the standards of most large advertisers are above reproach. The difficulty seems to lie more, not in deliberate deception, but in failure to give more objective information about the product. So far as the consumer is concerned, it is not easy to strike a balance between the advantages and disadvantages of nonprice competition.

SUGGESTED READINGS

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Chamberlin, Edward. *The Theory of Monopolistic Competition*, chaps. v–vii. 5th ed. Cambridge, Mass.: Harvard University Press, 1948. A fundamental work on the economic theory of product variation and selling costs.

Meyers, Albert L. *Elements of Modern Economics*, chap. xiv, "Selling Costs." 3d ed. New York: Prentice-Hall, Inc., 1948. A clear, elementary exposition of the economic theory of selling costs.

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Phillips, Charles F., and Duncan, Delbert J. *Marketing*, chap. xxvi, "Nonprice Competition as a Selling Policy." Chicago: Richard D. Irwin, Inc., 1948. A good integration of marketing practice and economic theory at the elementary level.

APPENDIX

Under the N.R.A. codes, businessmen were frequently forbidden to cut prices. As a result numerous forms of evasion sprang up. The following list of concessions designed to influence sales was prepared by the Division of Industrial Economics of the National Recovery Administration:

1. Concessions primarily related to time of buyer's payment:
    - Discounts.
    - "Terms" and "conditions" of sale or payment.
    - Credit practices.
    - Credit terms.
    - Cash discounts.
    - Periods of free credit.
    - Interest rate beyond free-credit period.
    - Datings.
    - Seasonal datings.
    - Installment sales.
    - Deferred payment.
    - Anticipation of bills.
    - Sales to delinquent accounts.
    - Sales not contingent upon buyer's credit standing.
    - Payment due when money received from other sources.
    - Retained percentages.
2. Concessions primarily related to risks of buyer:
    - Guarantees.
    - Price guarantees.
    - Contracts for deferred delivery not subject to price change.
    - Price offer not subject to change
    - Advance notification of price change.
    - Delaying acceptance of order.
    - Options.
    - Agreements indefinite as to time or quantity.
    - Offers without time limit.
    - Offers not expiring within specified period of time.
    - Offers without withdrawal provisions.
    - Guaranties against defective goods.
    - Product guarantees.
    - Product guarantees against other than defective merchandise.
    - Uniform product guarantees specified in code.
    - Guarantees in excess of manufacturers' warranty (distributing and fabricating codes).
    - Maintenance guarantees.
    - Adjusting incorrect shipments.
    - Accepting return of merchandise.
    - Accepting return of obsolete, discontinued or "unsalable" merchandise.
    - Exchanging merchandise.
    - Accepting return of other than defective merchandise.
    - Repurchase agreements.
    - "Money-back" agreements.
    - Sales subject to trial.
    - Sales on approval.
    - Shipments without order.
    - Sales on consignment or memorandum.

Storing goods with customer.
Display for direct sale in customer's store.
Renting or leasing industry products.
Resale guarantees.
Agreeing that payment be governed by sales of secondary product.
Accepting orders for specific jobs before customer secures award.
Guaranteeing accounts due customers.
"Compensation of customer for business losses."
Unilateral agreements (buyer not bound).
Contracts containing penalty clauses.
Contracts containing liquidated damages clauses.
Contracts not subject to adjustment necessitated by noncontrollable factors.
Assuming liability for nonperformance caused by noncontrollable factors.
Assuming liability for damage to buyer's drawings or equipment caused by noncontrollable factors.
Assuming liability for errors in plans or specifications furnished or approved by buyer.
Assuming liability for consequential damages.
Assuming liability for patent infringement.
Failure to give advance notice of discontinued lines.

3. Concessions primarily related to supplying additional goods:
Any gratuities.
Free deals.
Premiums.
Sales of other or additional goods at reduced prices.
Combination sales.
Combination offers.
Coupons.
Samples.
Scrip books.
Prices.
Sales promotion awards.
Containers.
Special containers.
Labels.
Special labels.
Special equipment.
Accessories.
Certain advertising material.
Display materials.
Printed matter (other than advertising material).

4. Concessions rendered buyer through use of seller's employees or property:
Any unusual service.
Providing sales help.
Demonstrating.

Estimating.
Furnishing drawings.
Furnishing plans and specifications.
Furnishing surveys and formulas.
Installation and erection.
Inspections.
Furnishing unusual processing services specified in codes.
Stampings or markings.
Repair and maintenance.
Reconditioning.
Engineering services.
Handling.
Crating or packing.
Repacking.
Delivery service by seller's trucks.
Warehousing and storage.
Lending of equipment.
Permitting retention of trade-in equipment.

5. Concessions rendered buyer through financial assistance or favors:
   Favors.
   Entertainment.
   Patronizing publications in which buyer is interested.
   Participating in group showing.
   Gifts.
   Gifts to organizations (in which buyer is interested).
   Paying buyer's personal expenses.
   Paying permit or inspection fees of buyer.
   Paying customer's insurance.
   Paying customer's advertising expenses for products other than member's.
   Assuming reversed telephone or telegraph charges.
   Assisting customer to obtain used products for trade-ins.
   Assisting customer to find purchaser for used products.
   Subsidizing or financing buyer.
   Employing customers, employees, relatives, associates.
   Purchase of buyer's capital stock.
   Financing payments due customer.
6. Concessions related to manner and/or time of shipment:
   Split shipments.
   Shipments smaller than specified minimum.
   Tolerance in time of shipment.
   Deferred delivery.
7. Concessions through payment or diversion of commissions or fees to customer:
   Payment of commissions or fees by members to buyers.
   Payment of commissions or fees by members to other than bona fide or controlled sales representatives.

  Payment of commissions or fees by members to purchasing agents compensated by buyers.
  Payment of commissions or fees by agents of members to buyers.
  Splitting of commissions or fees by agents of members with agents of buyers without buyer's knowledge.
  Splitting of commissions or fees by members or their agents with buyers or their agents.
  Payment of brokerage to other than bona fide brokers.

8. Concessions through allowances or payments for value rendered by buyer:
   - Allowances.
   - Trade-in allowances.
   - Advertising allowances.
   - Catalogue allowances.
   - Distribution service allowances.
   - Container allowances.
   - Installation allowances.
   - Allowance for further processing.
   - Maintenance or repair allowance.
   - Rental allowances for space hired.
   - Allowance on supplies furnished by purchaser for production of product ordered.
   - Cartage allowances when buyer receives goods at factory.
   - Allowance for special service.
   - Label allowances.
   - Purchasing from buyer.
   - Renting from buyer.
9. Concessions through acceptance of competitor's materials from buyers:
   - Exchange of own for competitor's products.
   - Purchase of competitor's products from customer.
10. Concessions through sale of substandard or obsolete goods:
    - Sale of seconds.
    - Sale of used goods.
    - Sale of damaged goods.
    - Sale of rebuilt or overhauled goods.
    - Sale of demonstrators.
    - Sale of obsolete goods.
    - Sale of discontinued lines.
    - Willful manufacture of substandard products.
    - Sale of returns.
    - Sale of scrap.
    - Sale of chaff.
    - Sale of culled goods.
    - Sale of surplus stock.
11. Concessions granted during performance contrary to provisions of agreement:

Rebates.
Departure from credit terms of contract.
Settlement of old accounts at less than full value.
Permitting improper deductions when buyer remits.
Permitting buyer's cancelation or repudiation.
Substitution of higher quality or greater quantity of goods.
Substitution of new contract at lower price.
Receipting bills before payment.
Extending or exceeding contract.
Collateral agreement not to enforce part of contract.
Departure from delivery date of contract.
Retroactive settlement or adjustments.

12. Acceptance of forms of payment in which concessions may be concealed:
    Accepting securities.
    Accepting buyer's capital stock.
    Accepting goods from buyer.
    Accepting real or personal property.
    Accepting negotiable instruments.
    Accepting other than lawful money.
    Accepting credit transferred from one buyer to another
    Selling for customer account and accepting proceeds for credit.
    Accepting form of payment other than specified in code.
    Accepting rental payments as part payment on purchases.
    Accepting deposit made to another manufacturer.
    Assignments (of receivables, etc.).
13. Types of agreements, offers, invoicing, etc., by means of which concessions may be concealed:
    Oral agreements.
    Oral offers.
    Oral appraisals.
    Oral orders.
    False billing.
    False orders.
    False receipts.
    False agreements.
    False offers.
    Delayed billing.
    Misdated invoices.
    Misdated contracts.
    Misdated orders.
    Misdated offers.
    Misdated receipts.
    Invoices omitting terms of sale.
    Invoices omitting date of shipment.
    Invoices omitting specifications.
    Invoices omitting other specified detail.

Agreements omitting terms of sale.
Agreements omitting date of shipment.
Agreements omitting specifications.
Agreements omitting other specified detail.
Offers omitting terms of sale.
Offers omitting date of shipment.
Offers omitting specifications.
Offers omitting other specified detail.
Orders omitting terms of sale.
Orders omitting date of shipment.
Orders omitting specifications.
Orders omitting other specified detail.
Split billing.
Lump sum offers.
Unitemized billing.
Orders not subject to member's acceptance.
Auction sales.

14. Types of agreements, offers, invoicing, etc., primarily designed to prevent the concealing of concessions:
    Uniform contract form.
    Uniform order form.
    Uniform bid or quotation form.
    Standard invoice form.
    Standard leasing form.
    Form of contract.[28]

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[28] *T.N.E.C. Monograph No. 1*, pp. 94–98.

Case V-1: NATIONAL ELECTRICAL SUPPLY CORPORATION[1]

In December, 1947, the National Electrical Supply Corporation faced a decision as to which elements to stress in its selling appeal. For many years the management had prided itself on the superior quality of its products, and it was generally assumed that buyers were more influenced by quality than by other factors in purchasing these products. The company's advertising, therefore, emphasized the high-quality standards maintained over the full range of its products.

Quality was particularly important in the use of electrical supply items such as those sold by the company, because a failure in performance could "knock out" a power line for a period of hours until repairs could be made. Defective parts necessitated replacement operations at inconvenient hours, in adverse weather, and at additional expense to user companies because of overtime payments.

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[1] Fictitious name.

Moreover, when a line was "knocked out," there was not only the loss of good-will of electricity consumers to consider but the substantial loss of revenues so long as power was shut off. It was imperative, therefore, that high-quality standards be maintained for supply items of this sort, and to this end the National Electrical Manufacturers' Association set minimum quality standards, in the period 1935–40, for use in the trade. By 1941 practically all manufacturers of these electrical supply items were consistently meeting these standards of quality. It was generally recognized that, in order to compete in this field, manufacturers were forced to make products of high quality.

Because of the general adoption of quality standards by competitors, some members of the management of the National Electrical Supply Corporation questioned whether continued emphasis of quality constituted a strong selling appeal. It was decided, therefore, to survey the buying motives of the industrial consumers of these products. The company's director of market research was requested to draft a questionnaire embodying the principal inquiries relating to buying motives. A random sample of 160 firms, conforming percentagewise to the geographical distribution of consumers and to the types of consumers, was employed. Actual interviewing was done by a nationally recognized market research firm, so that the company could remain anonymous. The questionnaire was devised so as to eliminate as far as possible bias and rationalized answers (i.e., answers which "sounded good" to the respondent but which did not necessarily represent his actual attitudes or actions). Interviewers were directed to question the person or persons within the selected organizations who were actually responsible for choosing the brand of supply items to be purchased.

When the results of the survey were tabulated, in April, 1948, it was discovered that the factors of quality and service were the most popular buying motives, as indicated in Exhibit 1. "Recognized quality of products" had been explained to respondents by the interviewers as meaning the general acceptance by the customer of the company's reputation for making good products. "Technical excellence," on the other hand, indicated satisfactory experience by testing the product in use. "Service" was interpreted as promptness in replying to correspondence on the part of the seller, quick and satisfactory handling of complaints and disagreements, and the rendering of special services.

In response to the question "Which of the above reasons [those given in the preceding question] is most important?" it was discovered that service outweighed other considerations, as indicated in Exhibit 2. Officials of National noted that the factor "price" was much less often mentioned than were quality and service.[2]

A third question related to the respondent's opinion of competing brands. It was: "In your opinion which electrical supply item manufacturer has the most satisfactory product?" Respondents were asked to volunteer the name of a company in answer. The results are tabulated in Exhibit 3. Executives of National noted the large number of respondents who believed that there was little difference among brands and who could, therefore, presumably be influenced to buy any brand. They also noted the greater preference for National among purchasers of Product A than among purchasers of Product B. Further analysis of the results revealed that those respondents who chose National as "outstanding" generally considered "quality of product" as their prime buying motive. In contrast, most other purchasers specified "service" more often as a dominant buying motive. Officials of National concluded that pur-

Exhibit 1

REASONS GIVEN BY RESPONDENTS FOR SELECTING A PARTICULAR BRAND OF ELECTRICAL SUPPLY ITEM

Reason	*Percentage of Respondents Mentioning*	
	Product A	Product B
Recognized quality of products	69	66
Service	63	61
Price	47	44
Technical excellence of the product	38	36
Early delivery	37	38
Long-standing relationship with the manufacturer	31	30
Technical advice given by manufacturer	31	30
Progressiveness of the manufacturer	26	23
Capability of manufacturer's salesmen	20	18
Salesman's tendency to be on spot when order to be placed	19	19
Information gained from manufacturer's advertising	14	13
Reciprocity	8	5
Standardization policy	4	4
Long-standing relationship with distributor	2	2

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[2] Prices for the products of most manufacturers of electrical supply items did not vary greatly. The three largest companies accounted for 80 per cent of total sales.

Exhibit 2

MOST IMPORTANT REASONS FOR SELECTING A PARTICULAR BRAND OF ELECTRICAL SUPPLY ITEM

Reason	*Percentage of Respondents Mentioning* Product A	Product B
Service	26	26
Recognized quality of product	23	23
Price	9	9
Long-standing relationship with the manufacturer	6	6
Technical excellence of the product	6	6
Salesman's tendency to be on the spot when order to be placed	4	4
Standardization	3	3
Early delivery	3	4
Capability of salesmen	1	2
Long-standing relationship with distributor	1	1
Progressiveness of manufacturer	1	1
Reciprocity	1	1
War reciprocity	1	1
Technical advice given by manufacturer	1	1
Availability	1	1
Engineering specifications	1	1
Business division policy	1	1
No answer, don't know, etc	11	9
	100	100

Exhibit 3

RESPONDENTS' OPINIONS REGARDING WHICH MANUFACTURER OF ELECTRICAL SUPPLY ITEMS HAS THE MOST SATISFACTORY PRODUCT

PRODUCT A		PRODUCT B	
Manufacturer	Percentage of Companies Specifying	Manufacturer	Percentage of Companies Specifying
National	28	Company I	50
Company A	24	Company J	21
Company B	15	Company K	18
Company C	13	Company L	5
Company D	4	National	3
Company E	4	Company M	2
Company F	4	Company N	1
Company G	3		
Company H	3		
Others	2		
	100		100

chasers rating quality above other characteristics tended to buy from National, while those preferring service tended to buy from competitors.

On the basis of the findings of the survey, the director of market research presented several recommendations to management. Among these recommendations were the following:

1. That National advertising feature, whenever possible, the advantages of dealing with a company which always stands ready to offer "service to its customers"
2. That the field organization and the general office answer correspondence promptly—preferably within twenty-four hours
3. That the company make every effort to adjust complaints to the customer's satisfaction
4. That special customer requests be handled expeditiously whenever possible

QUESTIONS

1. Was the director of market research justified in recommending emphasis on service instead of quality?
2. What would be the probable effect on National's present customers if advertising emphasis were shifted?

Case V-2: CIGARETTE ADVERTISING[1]

Advertising expenditures by manufacturers of tobacco products have for many years been among the highest of any industry. Much of the total has been devoted to the advertising of cigarettes. In 1939 cigarettes accounted for three-fourths of the estimated total advertising expenditure of $60 million on tobacco products. In 1931 the Association of National Advertisers reported the expenditures of four large tobacco companies as averaging 8.23 per cent of sales. In recent years advertising expense of individual companies has ranged from 6 to 30 per cent.

Approximately three-quarters of all advertising expenditures on cigarettes and about the same share of total sales were made by these companies: the American Tobacco Company, with its Lucky Strike brand; the Liggett and Myers Company, with the Chesterfield brand; and the R. J. Reynolds Company with the Camel brand (see Exhibit 1). The dominance of the cigarette market by these three companies, combined with their heavy advertising outlays, led certain critics to charge that other companies had been prevented from getting a large share of the market because they could not match these expenditures.

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[1] This case is based on materials contained in Professor Neil H. Borden's volume, *The Economic Effects of Advertising* (Chicago: Richard D. Irwin, Inc., 1942), chap. viii.

Exhibit 1

CIGARETTE CONSUMPTION BY BRAND AND TRACEABLE ADVERTISING EXPENDITURE IN NEWSPAPERS, MAGAZINES, FARM PUBLICATIONS, AND CHAIN RADIO, 1929–39

YEAR	CAMEL		CHESTERFIELD		LUCKY STRIKE		TEN-CENT BRANDS		ALL OTHER		GRAND TOTAL	
	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)	Consumption (Billions of Cigarettes)	Traceable Advertising Expenditure (Thousands of Dollars)
1929	40.0	$ 1,942	26.0	$ 5,254	36.4	$ 6,589		. . .	16.6	$ 7,022	119.0	$20,806
1930	38.0	4,813	25.0	5,968	42.6	10,095	. . .	. . .	14.0	5,142	119.6	26,018
1931	33.0	10,006	24.6	9,130	44.6	13,649	. . .	. . .	11.2	5,210	113.4	37,996
1932	24.6	2,389	21.0	11,138	37.0	10,850	12.0	$ 26	9.0	4,058	103.6	28,461
1933	26.5	10,248	29.0	7,590	37.5	7,192	8.5	100	10.3	2,340	111.8	27,471
1934	32.0	10,382	33.5	9,575	33.5	8,120	13.0	143	13.6	3,441	125.6	31,661
1935	37.0	9,265	36.0	9,443	32.5	5,588	13.1	68	16.0	4,852	134.6	29,216
1936	43.0	9,042	38.0	8,909	37.0	6,846	16.0	827	19.2	6,848	153.2	32,472
1937	45.0	8,529	38.0	8,949	38.5	5,617	19.0	470	22.1	7,191	162.6	30,755
1938	41.0	8,362	37.1	9,279	38.3	4,095	24.0	483	23.0	4,866	163.7	27,085
1939	40.0	7,367	36.5	7,776	39.5	4,214	30.0	1,157	26.4	4,442	172.4	24,956
Average	36.4	$ 7,496	31.4	$ 8,455	37.9	$ 7,532	17.0	$ 409	16.5	$ 5,037	134.5	$28,809

Source: Neil H. Borden, *The Economic Effects of Advertising* (Chicago: Richard D. Irwin, Inc., 1942), p. 229

The R. J. Reynolds Company began the practice of concentrating advertising on one brand of cigarette with the introduction of Camels in 1913. Reynolds' share of the cigarette market rose from 0.2 per cent in 1913 to 40 per cent in 1917 and 45 per cent in 1925. Noting the success of Camels, the Liggett and Myers Company similarly concentrated advertising on its brand, Chesterfield, which had been launched in 1912. American Tobacco Company followed with the Lucky Strike brand in 1917. In 1926 the P. Lorillard Company attempted to enter the field with its Old Gold brand. It embarked on an ambitious advertising campaign, financed by the flotation of a $15 million issue of debenture bonds in 1927. Despite large advertising expenditures, which exceeded $1½ million by 1938, the Old Gold brand failed to increase its share of the market, as is indicated in Exhibit 2. In January, 1933, the Philip Morris Company, launched a new blend of 15-cent cigarettes under the brand name Philip Morris. The new brand was first tried experimentally in certain large cities, where it met with such success that the company began an extensive advertising campaign financed out of earnings. By 1939, expenditures for advertising exceed $1,500,000, and the company was firmly intrenched in fourth place.

Relying on an inelastic demand for the product, the leading tobacco companies raised the wholesale price of cigarettes from $6.00 per thousand to $6.40 in October, 1929, and to $6.85 in June, 1931. These wholesale prices resulted in retail prices on the more popular brands of 14 and 15 cents per package. The maintained high prices of the leading brands encouraged transference of demand, particularly after June, 1931, to 10-cent cigarettes, as indicated by Exhibit 3. Prior to 1931 there were only two 10-cent brands of significance, Coupon, sold by Liggett and Myers, and Paul Jones, sold by Continental Tobacco Company. After June, 1913, several "other companies entered the field: in September, Larus & Brothers, Inc.; in March, 1932, Brown & Williamson Tobacco Company reduced the price on its Wings brand to put it in the 10-cent class; in May, 1932, Sunshines, manufactured by the Pinkerton Tobacco Company, were put in the 10-cent class; in June, 1932, Axton-Fisher entered its new brand, Twenty Grand; during the same month, Scott & Dill came into the scramble; and in September, Stephano Brothers brought out Marvels. The rise in sales of the 10-cent brands during the depression was phenomenal. Starting almost from nothing in 1931 they accounted for over 20% of the domestic cigarette market for

Exhibit 2

ESTIMATED DOMESTIC CONSUMPTION OF LEADING BRANDS IN BILLIONS OF CIGARETTES AND PERCENTAGE OF TOTAL CONSUMPTION BY BRANDS, 1929–39

Year	Camel		Chesterfield		Lucky Strike		Old Gold	
	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total
1929	40.0	33.6	26.0	21.8	36.4	30.6	8.0	6.7
1930	38.0	31.8	25.0	20.9	42.6	35.6	8.0	6.7
1931	33.0	29.1	24.6	21.7	44.6	39.3	7.6	6.7
1932	24.6	23.7	21.0	20.7	37.0	35.7	5.7	5.5
1933	26.5	23.7	29.0	25.9	37.5	33.1	5.5	4.9
1934	32.0	25.5	33.5	26.7	33.5	26.7	5.0	4.0
1935	37.0	27.4	36.0	26.7	32.5	24.1	5.3	3.9
1936	43.0	28.1	38.0	24.8	37.0	24.2	6.8	4.4
1937	45.0	27.7	38.0	23.4	38.5	23.7	7.9	5.0
1938	41.0	25.0	37.4	22.8	38.3	23.4	6.3	3.8
1939	40.0	23.2	36.5	21.2	39.5	22.9	5.3	3.1

Year	Philip Morris		Mentholated Brands		Combined Ten-Cent Brands		All Other Brands		Total Billions	% of Total Represented by Three Leading Brands
	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total	Cigarettes (Billions)	% of Total		
1929							8.6	7.2	119.0	86.0
1930							6.0	5.0	119.6	88.3
1931			*		*		3.6	3.2	113.4	90.1
1932	*		*		12.0	11.6	3.3	3.2	103.6	80.1
1933	*		*		8.5	7.6	4.8	4.3	111.8	82.7
1934	2.8	2.2	3.3	2.6	13.0	10.4	2.5	2.0	125.6	78.9
1935	3.8	2.8	4.1	3.0	13.1	9.7	2.8	2.1	134.6	78.2
1936	5.0	3.3	3.7	2.4	16.0	10.4	3.7	2.4	153.2	77.1
1937	7.5	4.6	2.6	1.6	19.0	11.7	4.1	2.5	162.6	74.8
1938	9.2	5.6	1.9	1.2	24.0	14.7	5.6	3.4	163.7	71.2
1939	11.0	6.4	2.0	1.2	30.0	17.4	8.1	4.7	172.4	67.3

* Included in "All Other Brands."

Source: "Basic Survey—Tobacco," *Standard Trade and Securities*, Vol. XCVI, No. 20 (June 7, 1940), Sec. 3, pp. T9–13.

a few months during the fall of 1932."[3] On January 3, 1933, the Big Three reduced wholesale prices to $6.00 per thousand, and a month later to $5.50. Retail prices fell to 12½ cents, then to 10 and 11 cents. With the price differential for the leading brands practically removed, sales of 10-cent cigarettes fell from 21.3 per cent of total sales in December, 1932, to 6.4 per cent in May, 1933. During all this period retail prices of Philip Morris cigarettes were maintained at 15 cents. In January, 1934, the Big Three increased wholesale

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[3] *Ibid.*, p. 254

Exhibit 3

PERCENTAGE OF TOTAL CIGARETTE SALES SECURED BY THE 10-CENT BRANDS BY MONTHS FROM JANUARY, 1931, TO FEBRUARY, 1936, INCLUSIVE

Month	1931	1932	1933	1934	1935	1936
January	0.26	2.33	16.76	10.00	10.85	10.59
February	0.27	3.30	11.60	9.96	11.71	10.51
March	0.28	3.26	7.07	10.43	11.25	
April	0.27	6.13	8.55	11.11	11.70	
May	0.23	6.59	6.43	10.37	11.72	
June	0.28	9.12	7.03	10.01	11.30	
July	0.57	12.46	9.58	12.09	11.87	
August	1.82	17.76	8.67	12.38	13.72	
September	2.00	19.57	9.78	11.62	13.53	
October	2.41	19.00	9.54	12.46	11.01	
November	2.30	22.78	11.21	13.13	12.15	
December	2.88	21.31	9.26	12.28	12.54	

Source: *Report of the Federal Trade Commission on Agricultural Income Inquiry, Part I "Principal Farm Products."* Washington, D.C. Government Printing Office 1938, p. 462.

prices to $6.10 per thousand and in January, 1936, to $6.25, with resulting increases in retail prices to 12½ and then 13½ cents a package. The 10-cent brands responded by increasing to a share of the total market which ranged from 10 to 12 per cent. By 1939, however, this share had increased to over 17 per cent.

In 1936 most of the companies producing 10-cent cigarettes swung over to advertising, as indicated in Exhibit 1. Although it was clear that their margins could not permit the extensive advertising employed by the standard brands, they thought that a limited amount was desirable to build volume.

A survey by *Fortune* magazine in 1935 indicated that cigarette smokers did not frequently shift brands. In response to the question, "How many years have you been smoking this brand?" the survey reported the following replies:

Years	*Per Cent*	*Years*	*Per Cent*
1	12.6	5	10.1
2	12.9	Over 5	44.3
3	10.0	Don't know	4.2
4	5.9		

Managements of tobacco companies believed, however, that the stability of demand for their respective products was based largely on subjective valuations created by continued advertising outlays. Blindfold tests carried on experimentally among fifty-one subjects, all of whom smoked regularly and generally stuck to one brand,

Exhibit 4

IDENTIFICATION OF DIFFERENT CIGARETTE BRANDS IN BLINDFOLD TEST, 51 SUBJECTS

Brand	Per Cent of Subjects Identifying Brand in Column 1 as:					
	Camel	Lucky Strike	Chesterfield	Twenty Grand	Spud	Miscellaneous
Camel	31	14	38	6	2	10
Lucky Strike	19	41	21	4	0	14
Chesterfield	27	23	33	2	0	15
Twenty Grand	38	26	3	17	0	15
Spud	0	6	6	0	76	11

Source: R. W. Husband and Jane Godfrey, "An Experimental Study of Cigarette Identification," *Journal of Applied Psychology*, Vol. XVIII, No. 2, April, 1934, p. 222.

indicated the difficulty which consumers experienced in identifying brands. Each subject was tested with four cigarettes, three leading brands and one other. Each was told that his own brand would be among the four which were presented in random order. Adequate time was allowed between smokes to compensate for taste confusion and fatigue. Although chance alone would have resulted in a 25 per cent identification, only 31 per cent of the smokers guessed their own brand. The results are shown in Exhibit 4.

Although consumers found it difficult to identify brands, there were some indications that they discriminated among different brands of cigarettes as to blending and flavor. When the R. J. Reynolds Company introduced Camel cigarettes in 1913, the product was based on a domestic blend of bright leaf tobacco. This proved so popular that Camels quickly rose to first place. Competition thereupon followed with the promotion of domestic blends. In the opinion of executives of the major companies the success of any cigarette was determined to a considerable extent by the flavor or blend of the product. The failure of one brand of cigarettes, which was supported by large advertising expenditures, was attributed to the lack of success in finding an acceptable blend. In the first three months that the cigarette was on the market it enjoyed a large sales volume, but soon it became evident to company executives that it had failed to win lasting consumer acceptance. Sales dropped. Investigation showed that many consumers, after once trying the new cigarette, did not repurchase. Executives believed that, although the blend approximated those of the leading brands, it had failed basically because consumers did not like it. The importance of blend led the Philip Morris Company, before placing the cigarette of that name on the market in 1933, to work out a large number of blends. The blenders then chose what they regarded as the twenty best blends from this group and forwarded them to company executives for final selection. The executives, after careful consideration, finally selected the blend which later met with great consumer favor. Another illustration of the importance of blend was the transference of demand from the inferior tobaccos of the 10-cent cigarettes to the standard brands in 1933, when differentials between these two groups were virtually eliminated. Consumers were evidently sensitive to quality differences where price differentials were not great.

Although advertising expenditures of each of the Big Three were vastly in excess of those of other companies in the field in the period of 1930–39, the three leaders did not hold the same relative positions throughout the period. Moreover, as is indicated in Exhibits 5 and 6, the advertising outlays of these companies varied in effectiveness. Over this ten-year period Chesterfield spent an average of $280,000 in advertising for each billion cigarettes sold; Camel spent $211,000;

Exhibit 5

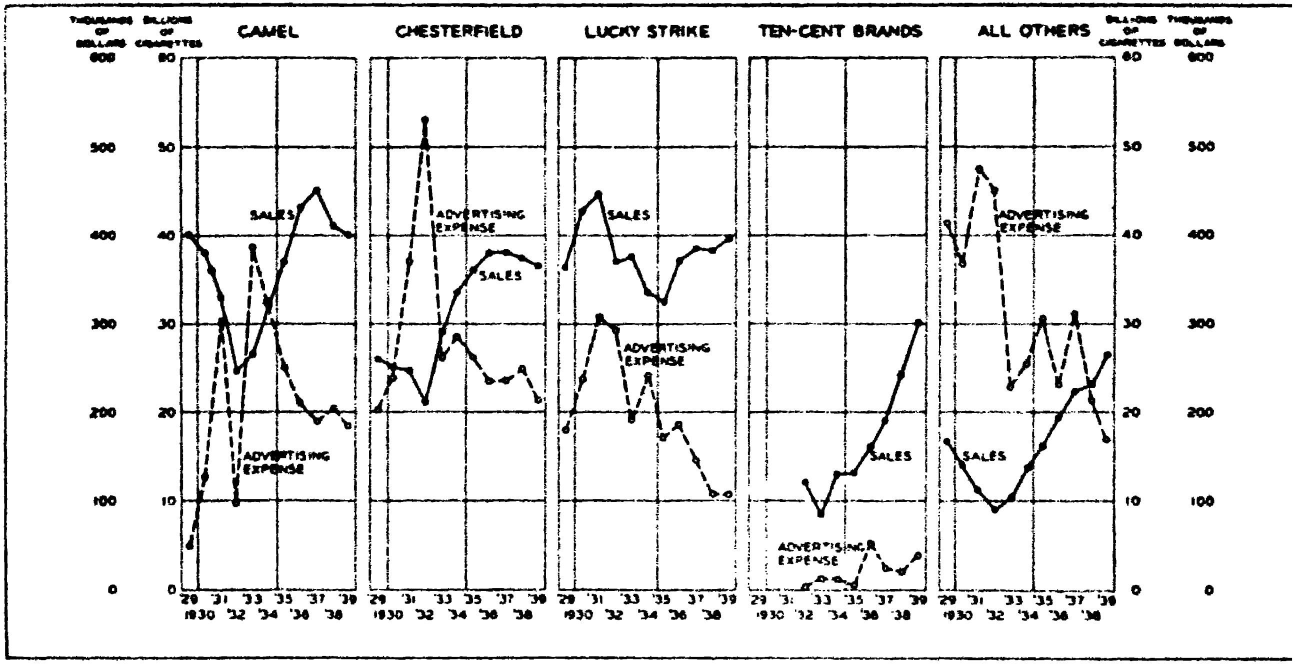
BILLIONS OF CIGARETTES SOLD AND TRACEABLE ADVERTISING EXPENDITURE IN NEWSPAPERS, MAGAZINES, FARM JOURNALS, AND CHAIN RADIO OF CIGARETTE BRANDS, IN THOUSANDS OF DOLLARS FOR EACH BILLION OF CIGARETTES SOLD, 1929–39

Year	Camel		Chesterfield		Lucky Strike		Ten Cent Brands		All Others	
	Advertising, Thousands of Dollars per Billion Cigarettes	Billions of Cigarettes Sold	Advertising, Thousands of Dollars per Billion Cigarettes	Billions of Cigarettes Sold	Advertising, Thousands of Dollars per Billion Cigarettes	Billions of Cigarettes Sold	Advertising, Thousands of Dollars per Billion Cigarettes	Billions of Cigarettes Sold	Advertising, Thousands of Dollars per Billion Cigarettes	Billions of Cigarettes Sold
1929	48.5	40.0	202.1	26.0	180.2	36.4			413.0	16.6
1930	126.7	38.0	238.7	25.0	237.0	42.6			367.3	14.0
1931	303.2	33.0	371.1	24.6	306.0	44.6			473.7	11.2
1932	97.1	24.6	530.4	21.0	293.3	37.0	2.4	12.0	450.9	9.0
1933	386.7	26.5	261.7	29.0	191.8	37.5	11.8	8.5	227.2	10.3
1934	324.4	32.0	285.8	33.5	242.4	33.5	11.0	13.0	253.0	13.6
1935	250.4	37.0	262.3	36.0	171.9	32.5	5.2	13.1	303.3	16.0
1936	210.3	43.0	234.4	38.0	185.0	37.0	51.6	16.0	230.3	19.2
1937	189.5	45.0	235.5	38.0	145.9	38.5	24.7	19.0	309.8	22.1
1938	203.9	41.0	248.1	37.4	106.9	38.3	20.1	24.0	211.6	23.0
1939	184.2	40.0	213.1	36.5	106.7	39.5	38.6	30.0	166.3	26.4
Average	211.4	36.4	280.3	31.4	199.0	37.9	20.7	17.0	309.8	16.5

Source: Neil H. Borden, *The Economic Effects of Advertising* (Chicago: Richard D. Irwin, Inc., 1942), p. 243

Exhibit 6

TRACEABLE ADVERTISING EXPENDITURES PER BILLION CIGARETTES, AND SALES IN BILLIONS, BY BRANDS, 1929-39



Source: Neil H. Borden, *The Economic Effects of Advertising* (Chicago: Richard D. Irwin, Inc., 1942), p. 244.

and Lucky Strike $199,000. By contrast, the 10-cent brands spent less than $30,000 per billion cigarettes sold.

QUESTIONS

1. Evaluate the various competitive factors influencing the sale of cigarettes.
2. Were the makers of 10-cent cigarettes well advised to use advertising?
3. "Price cutting depends for its effectiveness upon the elasticity of demand; advertising relies on shifts of demand." Comment.

Case V–3: YELLOW CAB COMPANY, BALTIMORE, MARYLAND

In January, 1950, the Yellow Cab Company of Baltimore, Maryland, faced the problem of whether to maintain the high standard of telephone-order service which it had built up since 1946. Despite the highest level of sales in the four-year period since World War II, the year 1949 showed the lowest profits of any in this period

Exhibit 1

PROFIT AND LOSS STATEMENT FOR CALENDAR YEARS 1946–49

Description	1946	1947	1948	1949
Revenue:				
Income from sale of service	$1,486,262.45	$2,262,808.60	$2,454,487.79	$2,504,711.72
Other operating revenue			11,262.74	9,577.66
Total Revenue	$1,486,262.45	$2,262,808.60	$2,465,750.53	$2,514,289.38
Costs:				
Chauffeurs' commissions for services	624,215.20	950,235.61	1,057,722.43	1,097,308.61
Other operating and maintenance costs	596,105.80	862,512.97	944,563.44	956,824.48
Depreciation	65,952.19	180,294.36	194,183.12	208,391.84
Operating taxes and licenses	31,484.03	43,003.79	45,431.91	43,503.09
Administration expenses (executive and office salaries, office supplies, legal fees, sundry expenses, etc.	87,797.72	114,954.73	129,161.87	121,154.06
Contingent insurance liability				33,240.75
Total Costs	$1,405,554.94	$2,151,001.46	$2,371,062.77	$2,460,422.83
Operating profit	$ 80,707.51	111,807.14	94,687.76	53,866.55
Other income:				
Income from sale of capital assets, interest, discount, etc.	38,448.87	118,203.10	111,862.43	63,326.15
Profit before income taxes and capital gains tax	$ 119,156.38	$ 230,010.24	$ 206,550.19	$ 117,192.70
Provision for income taxes and capital gains taxes	32,036.25	75,540.07	68,650.72	52,533.94
Net Profit	$ 87,120.13	$ 154,470.17	$ 137,899.47	$ 64,658.76

(see Exhibit 1). The decline in operating profits was accompanied by a decrease in nonoperating revenues derived from sale of capital assets, chiefly used automobiles. The president of the company, Mr. Robert Freedman, believed that the unsatisfactory profit results were attributable in part to the high cost of maintaining telephone-order service. He believed that, were the company to decrease its emphasis on telephone-order service and increase its share of pick-up business, profits, at least in the short run, would increase.

When the company had been taken over by a new management on January 15, 1946, it was in relatively poor condition. The fleet of cabs had deteriorated with hard use and poor maintenance during the war; buildings were badly in need of repair; employee morale was low. Sales had declined despite the flush of wartime business, and the cash position of the company was precarious. Telephone-order trips had declined to the vanishing point, and the company depended largely on pick-up business.

The new management promptly set about rebuilding the company. Major capital improvements were made in the buildings and shop equipment. Efficient maintenance and repair practices were instituted, and old cabs were replaced with new automobiles as rapidly as they could be procured from the manufacturers. A new contract was signed with the union. Employee morale rose rapidly. Sales increased from less than $1½ million in 1946 to $2¼ million in 1947 and to $2½ million in 1949. Profits increased from $87,120.13 in 1946 to $154,470.17 in 1947.

The improvements in the company's operations were especially noticeable in the quality of service and in the number of telephone orders filled by the company.[1] A driver training program was begun, to improve the efficiency and courtesy of service. In recruiting new drivers, the company subjected candidates to driving tests, which included brake tests of the driver's reaction time in stopping the vehicle. Accident records of candidates were examined prior to hiring, and on-the-job training was conducted to promote safety. As new cabs became available, they were placed in service with drivers in order of seniority. The cabs were washed daily, and mechanical condition was checked regularly. A two-way radio system was installed in a number of cabs to improve telephone-order service through radio dispatching.[2] By 1949 two-way radios had been installed in 73 of the company's cabs.

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[1] The volume of telephone orders filled by a cab company was accepted in the trade as an important criterion of service rendered. The smaller independents confined themselves almost entirely to pick-up business. So important was telephone-order service that the Maryland Public Service Commission, which regulated cab service in the state, required cab drivers, after discharging passengers, to drive to the nearest stand and make their cabs available for telephone orders. This requirement was not generally honored, and the commission found enforcement difficult.

Revenues of the Yellow Cab Company, so far as they could be influenced by management, depended chiefly on the rate of utilization of its fleet of cabs. This was because two operating factors—rates and the number of cabs—were controlled by the Public Service Commission. Rates were set at 15 cents per mile, with a minimum charge of 25 cents. There was no supplemental charge for additional passengers. For telephone orders there was a surcharge of 10 cents, of which 9 cents went to the driver. These rates were about half as much as those prevailing in most American cities comparable to Baltimore.[3] The Public Service Commission limited the number of cabs enfranchised for operation in Baltimore to 1,158. Yellow Cab had 235 of these franchises—about 20 per cent. The commission believed it undesirable to increase the number of franchises beyond these limits. The Yellow Cab Company, therefore, confronted with a ceiling placed on rates and on the number of cabs operated, concentrated its attention on lifting the rate of utilization per cab. Of the total time that cabs were available for service, the company achieved a utilization rate of 98.46 per cent—practically full-time utilization.[4] Under these circumstances the management foresaw little hope for increasing total revenues.

Although the revenue per mile for the Yellow Cab Company was

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[2] Radio dispatching was essential to high-quality telephone-order service. Cabs in which radios were installed reported 12.68 telephone orders filled per day. Cabs without radios filled only 3.74 telephone orders per day. The company attributed this difference to the fact that with radio-dispatched cabs the driver was *directed* to take a telephone-order call, whereas in nonradio cabs the taking of telephone orders was left up to the driver's initiative.

[3] The company presented the following comparative statistics in its annual report for 1949, regarding rates for the first 1⅝ miles traveled:

	Cents		*Cents*
Baltimore	.25	Los Angeles	.70
Chicago	.55	Pittsburgh	.60
Cleveland	.55	Detroit	.35
New York (pending)	.60	St Louis	.45
Philadelphia	.55	Boston	.60

[4] "Total time available" was limited by the length of the combined night and day shifts of drivers who operated the vehicles. In 1949 this total was an average of 20.6 hours per day for the Yellow Cab Company. The difference between total time available and time utilized was accounted for by accidents, mechanical delays, scheduling, etc.

the lowest recorded in any major city by the Cab Research Bureau, Inc., which prepared comparative trade data annually, the company had established an enviable reputation for operating efficiency (see Exhibit 2). The president, Mr. Freedman, noted, however, that the operating cost for telephone-order service was well above that for pick-up service. Company records indicated that it cost about $1,150 per annum per cab to maintain the radio-dispatching system which was essential to the acceptance of telephone orders. It was necessary to rent two-way radio equipment for each of the 73 cabs, at a cost of about $1.00 per day per cab. Telephone boxes had to be maintained in various parts of the city, as well as several trunk lines at the main office. Nineteen operators were required to maintain the telephone dispatching system. Mr. Freedman calculated the cost of regular service and telephone-order service as follows:

Exhibit 2

SELECTED OPERATING DATA FOR 26 MAJOR CAB COMPANIES

Rank	Revenues per Mile	Cab Miles per Shift	Cab Trips per Day
Best	$0.2133		
Worst	0.0839	64.6	17.5
Average	0.1318	97.5	23.6
Yellow (Balt.)	0.0839 (26th)	125.0 (3d)	32.1 (3d)

Source: Cab Research Bureau, Inc., Cleveland

	Pick-up Service	*Tel.-Order Service*	
Average fare	$0.45		$0.55
Expenses:			
Direct costs of telephone service		$ .0643	
Driver's share of surcharge		0.0000	
Driver's regular commission	0.1980	0.1980	0.3523
Gross profit	$0.2520		$0.1977

From time to time the company had conducted consumer preference surveys in the city of Baltimore by sending out mailed questionnaires. These questionnaires were sent to a random sample of subscribers to telephone service, and the respondent was called on simply to answer four questions, sign his name, and post the self-addressed stamped card. In response to the question "If you wanted to call a cab, which company would you phone?" 74 per cent of the respondents replied "Yellow." In reply to the question "If you wanted to hail a cab and one from each company was equally convenient and available, which cab would you choose?" 72 per cent said "Yellow." These results were confirmed by subsequent surveys. Confirmation was also obtained from hearings of the Public Service Commission in 1949, which indicated that the Yellow Cab Company handled two-thirds of all telephone-order service in Baltimore. Internal records of the company also indicated a remarkable growth of telephone-order service, as shown in Exhibit 3. In the first quarter of 1950 telephone-order service rose to 19.37 per cent of all trips.

Exhibit 3

TOTAL TRIPS AND TELEPHONE-ORDER TRIPS, 1946-49

Year	Total Trips	Telephone-Order Trips	Percentage
1946	3,322,876	132,110	4.0
1947	5,025,776	328,411	6.5
1948	5,287,327	680,132	12.9
1949	5,437,054	930,219	17.1

QUESTIONS

1. Should the Yellow Cab Company have reduced emphasis on telephone-order service?
2. What would be the effect on the company's pick-up business if it should cease to promote telephone orders?

Part VI

FLUCTUATIONS IN ECONOMIC ACTIVITY

THE HISTORY of modern industrial nations is indelibly marked by upward and downward movements of economic activity, which have become popularly known as "business cycles." There is some objection to the use of the word "cycle" to describe these fluctuations in economic activity, since they are not of a *regularly* recurring nature. These alternate periods of "good" and "bad" times vary not only in duration but also in amplitude of fluctuation. The late Professor W. C. Mitchell defined a business cycle as "a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitude approximating their own."[1]

Because of the association of aggregate economic activity with cyclical movements, it is not always possible to determine whether the movement of a particular economic series is due to cyclical or other reasons. The downward movement of data concerning a particular industry does not indicate a cyclical movement. It is necessary to inquire into the nature of the causes of such behavior rather than assume that all upward and downward movements of all series are due to cyclical forces. Some industries may prosper more in depression periods than in times of prosperity. The complexity of the forces of economic fluctuations prevent quick and easy identification of cyclical behavior.

The lack of identity of movement of all economic series both in direction and in amplitude makes it well-nigh impossible for a businessman to avoid a forecast of the future. Decisions must be made in the present concerning the nature and magnitude of demand for his products in the future. This involves present commitments as to the volume of production, purchasing, inventory policy, selling costs and selling policy, price policy, and so on. Past experience provides a valuable guide for the executive of a firm, but the forecasting of future events involves considerably more than a mere projection of past business behavior. An analysis of the relationships of the past and an estimate of their reliability in the future is essential. In many cases there is statistical evidence available, together with logical explanations, to support the sequence of events. In other cases, however, forecasting is practically pure guesswork. The use of available data together with a knowledge of existing economic theory will usually provide the businessman with a more reliable estimate of the future than pure guess.

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[1] Wesley C. Mitchell, "Business Cycles," *The Problem and Its Setting* (New York: National Bureau of Economic Research 1927), p. 468.

Fluctuations in economic activity may be measured in terms of income (both money and real), employment, and production. These three series are not identical. Real income is a function of money income and prices; production differs from employment because of changes in productivity. Production also differs from real income in that inventory and capital accumulation or diminution causes discrepancies between the two. Generally, however, they move in a parallel fashion and reflect the upward and downward movements in economic activity.

Frequently an index of business activity is computed. These are computed by various firms and organizations, but, since all are not composed of the same series, they vary in their absolute value and behavior.[2] The movements of the Index of Business Activity, as computed by the Guaranty Trust Company of New York, are shown in Exhibit 1. This index is a composite of the indexes of steel ingot production, construction, cotton consumption, bituminous coal production, factory employment, carloadings, bank debits, and foreign trade. There is no one series which satisfactorily measures fluctuations in economic activity for all purposes. Upon examination of such single indexes, one finds that all the composite series do not move upward or downward during the same period of time, nor do those which do move in one direction do so at the same rate.[3]

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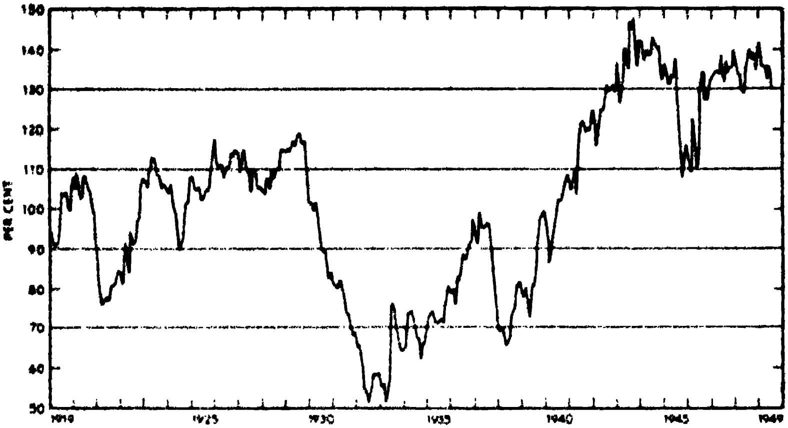
[2] They may also differ because of different weights assigned to the individual series and the use of different base years.

[3] "Of the eight adjusted series included in the combined index [Business Activity], five declined last month and one advanced. The other two series, factory employment and foreign trade, are not yet available. Two of the declines were due to increases

Exhibit 1

INDEX OF BUSINESS ACTIVITY COMPILED BY GUARANTY TRUST COMPANY FOR YEARS 1919–49



Source: *The Guaranty Survey*, July 27, 1949

Any index which is a composite of several series must, therefore, be an average which fails to disclose a complete picture of all phases of activity. Examination of Exhibit 2 reveals that the series presented there do not behave in an identical manner. Particular attention is directed to Series 37, *Loans of Reporting Member Banks*, and Series 38, *Net Demand Deposits of Member Banks*. These two series move in opposite directions for the periods shown. Comparison of Series 17 and 19 shows a contrasting behavior. The former exhibits considerably wider amplitude of fluctuation than does the latter.

It is essential, therefore, that the businessman not rely solely upon an index of general business activity. A close examination of the series which affect him most, together with an explanation of their past behavior, is of more importance than a general index. In an attempt to obtain a picture of general retail buying for the coming year, an estimate of expected income payments to individuals becomes important, but, to the manager of a chain store specializing in women's apparel, data on sales of such specialty shops in relation

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of less than seasonal magnitude in the unadjusted figures. These were in bituminous coal production and railway freight loadings. Raw cotton consumption declined more than seasonally, while bank debits to deposit accounts outside New York City registered a decrease contrary to the usual seasonal tendency. The adjusted index of construction activity moved downward for the second consecutive month" (*The Guaranty Survey*, June 29, 1949).

to income payments to individuals in his particular market is of greater importance.

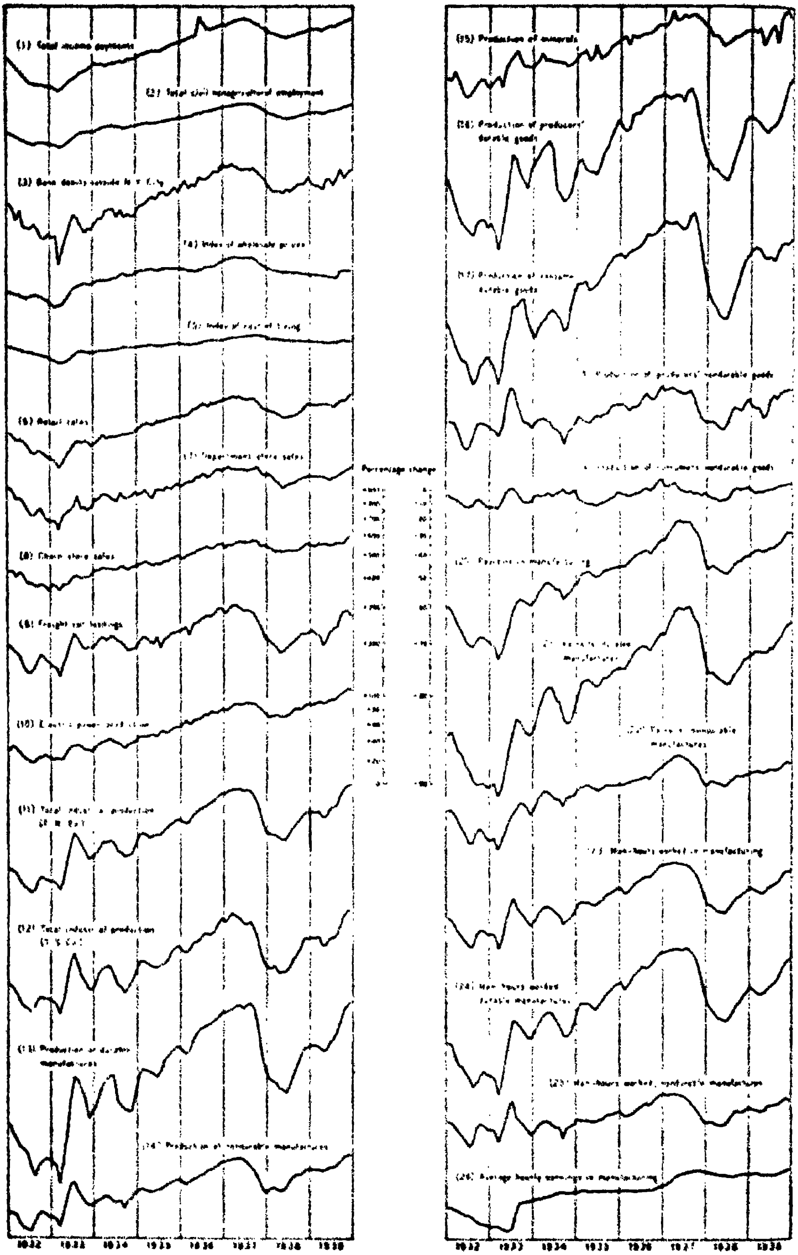
While there has been increasing effort on the part of government in various countries to reduce or eliminate the peaks and troughs of economic activity, such efforts have not yet been successful to the point where the businessman can depend upon them. He is forced to recognize the inevitability of such fluctuations and to include them in his planning for the future. He is, to be sure, interested in their causes and the remedies proposed for their cure, but his immediate attention is focused upon adjustment to their occurrence. In addition to a knowledge of past behavior of economic series, an understanding of the kinds of fluctuations and some theoretical framework in which to fit his observations and estimates are essential.

The businessman is primarily interested in three types of economic fluctuations: seasonal, cyclical, and long-term trend. These three types of fluctuations are distinguished primarily by the time periods involved. Seasonal variation is usually limited to a twelve-month period; cyclical fluctuation covers a period of several years; while long-term trend is thought of as covering one or more decades. There are other means of classification to distinguish between one type of movement and another, but no attempt will be made to outline them here. Which of these types will be of greater importance to a particular firm depends upon the nature of the firm and industry.

SEASONAL VARIATIONS

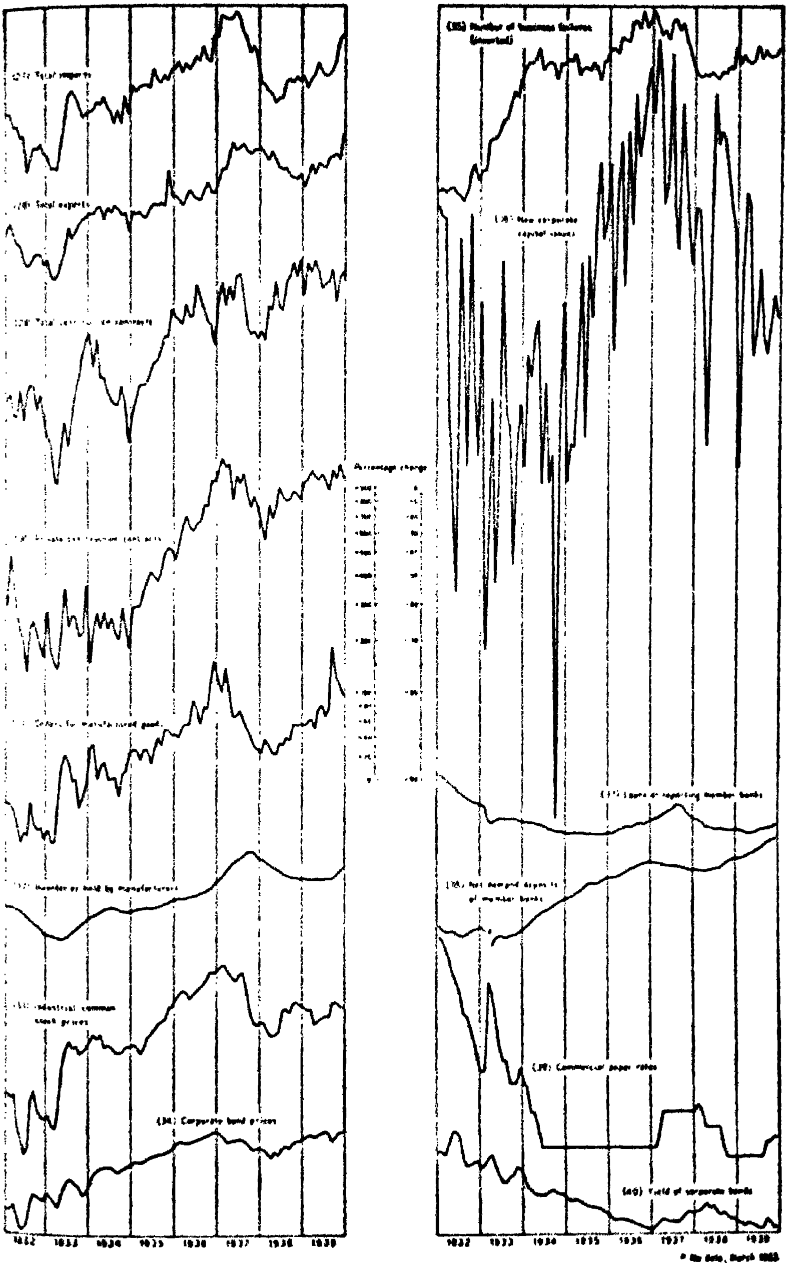
Seasonal variations are those fluctuations which regularly recur in some consistent pattern within a twelve-month period. They are known to occur in production, distribution, and consumption. While seasonal variations are generally thought of as fluctuations which occur only once during the year, there are also monthly, weekly, and daily seasonals. The rendering of bills for purchases charged during the month occurs usually during the first week of the month and does not recur until the following month. Department-store and apparel-store sales may reach a peak on Saturdays, with the low point on Mondays, depending upon the purchasing habits of the locality. Motion-picture theaters experience their peak of attendance during the evening hours, while the late morning and early afternoon hours of the day enjoy less than capacity attendance. Whatever the period of time used, if there is a seasonal variation of any kind, it will

Exhibit 2—BEHAVIOR OF FORTY



Source: Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*
York, 1946), pp. 84–85.

AMERICAN SERIES, 1932-39



(National Bureau of Economic Research, Studies in Business Cycles, No. 2) (Now Reproduced with permission.

show a consistent pattern of one or more peaks occurring throughout each period.

Seasonal variation arises because of the influence of one or both of two factors: weather and custom. Weather affects the production, distribution, and consumption of goods and services. Agricultural products can be planted and harvested only at certain periods of the year, and in most cases only one crop per year may be produced. The time of the year when such activity occurs depends upon the weather and the product. Wheat is harvested in the summer and fall but is consumed more or less regularly throughout the year. Since most major agricultural products are harvested during the same period, there is a seasonal demand for farm labor, transportation, and storage space. These demands must be met during and immediately following the harvest period if the crop is to have value. The operations of the iron ore mines in the Mesabi ranges of northern Minnesota are seasonal. During the spring, summer, and fall months ore is mined and transported to the smelting plants located in the regions bordering the southern shores of the Great Lakes. There is a heavy demand for shipping during these months to move this ore, and space is required to store it for use during the winter months when the lakes are not open to navigation. During the winter months mining operations are sharply curtailed or cease entirely. This means lay-offs for workers in the mines and consequent reduction in their expenditures at local stores unless there is another business in that locality which happens to have a seasonal peak during the winter months and a decline during the remainder of the year.

Frequently there is a seasonal in both the production and the consumption of a raw material, but they occur at different times of the year. Cotton for example, is harvested in the fall, but the demand for cotton clothing occurs in the spring and early summer. The same is true of wool, which is shorn from sheep in the spring but consumed most heavily during the winter months for warm clothing. Consumption may, however, be affected by the seasonal in production, such as the consumption of melons during the harvest season. Satisfactory methods of preserving melons are not yet known, so that they must be consumed shortly after being harvested. The same is true of many fresh fruits and vegetables, although the introduction of canning and quick freezing may tend to level out somewhat the seasonal in consumption of some of these. Industries which are closely allied to the production and consumption of these products also experience seasonal variations in their business except where standardization of product and ability to store it make possible more steady production throughout the year.

A seasonal variation due to custom is the sharp increase in retail sales in stores during the Christmas and Easter periods. This seasonal is exhibited in many lines. The banks are called upon to furnish more currency and coin for circulation during such periods. At the end of the Christmas shopping season, during the early weeks of January, currency and coin are returned to the banks and go out of circulation. Moreover, the seasonal rush of sales during the Christmas season does not mean that all lines of business engaged in trade experience a Christmas seasonal at the same time. In the manufacture of toys, for example, there is an increase in production in July, August, and September, after which there is a decline. This occurs because time must be allowed in which to place orders and make deliveries. This means that retailers and wholesalers must place orders in the summer months for Christmas merchandise. Immediately, they are faced with the making of a forecast of sales expected almost six months in the future. Following the seasonal rise in purchases during the summer, there is a seasonal increase in inventories during October and November. This is followed by the seasonal rise in sales during the latter part of November and the early part of December. Usually the peak occurs in the two weeks preceding Christmas Day. Similar seasonal developments occur in other industries according to the peculiarities of purchase, production, and sale.

The existence of a seasonal pattern in the original data may be tentatively established by plotting the data by months or weeks for each year. Connect the points freehand and compare the lines of fluctuation for several years. If the movements of the curves are similar, there is apparently a seasonal pattern present. If the movements show no similarity, the existence of a seasonal pattern is unlikely, even though the data for any particular year may fluctuate from month to month.

The measurement of seasonal variation is not precisely accurate. The use of the Gregorian calendar presents several problems. Easter sometimes falls in the first quarter, sometimes in the second quarter, of the year. In order to make a proper comparison from one year to the next when Easter is in a different quarter, an adjustment must be made. Furthermore, months range in length from twenty-eight to thirty-one days, so that some months may have five Sundays while others have only four. The number of days worked each week as well as the number of hours worked each day will affect the data for purposes of comparison. In comparing the performance of a given month in one year with the same month in another year, the data must be adjusted so that the working days are comparable. Some firms operate six days per week, while others are open only five. The adjustments to be made depend upon the particular firm or industry being studied for seasonal variation. This is quite important in retail sales, when the number of business days varies from month to month as well as from year to year for a given month.

One of the most widely used methods of measuring seasonal variation is the percentage of a twelve-month moving average. In order to measure the seasonal variation, it must first be isolated from other movements in the data. The twelve-month moving average method tends to do this roughly, since the seasonal occurs once each year. The first step is to calculate the twelve-month averages from the data. Next, calculate the percentage of the original data to the centered moving average. This result is the *specific* seasonal. A *typical* seasonal is obtained by averaging the percentages to moving averages for several years. This typical average may be converted into an index by a rather simple process.[4] This method of measuring seasonal variation is satisfactory where the seasonal pattern is fairly stable. It loses what accuracy it possesses, however, when the seasonal pattern changes over time. Where the seasonal is subject to change, another method of measurement should be used, such as a ratio of original data to line of trend fitted to specific seasonals by months.[5]

The mere existence of a seasonal pattern in the data should not be taken as complete evidence that there is a regularly recurring seasonal which will appear at the same time in the future. Empirical information as to what is going on in the industry is essential to interpret the seasonal pattern. Analysis should be undertaken to ascertain why the seasonal exists, before blind faith is placed upon the data alone. This is particularly important in attempting to forecast the amplitude of seasonal variation. During the upswing of the business cycle the current seasonal index may show a consistent increase for corresponding months over several years. At the time of such occurrence it is necessary to forecast whether this is a changing seasonal or an increase due to cyclical or other factors. Also included in such a change are trend or growth factors which cloud the future of a forecast. Additional information is necessary to supplement the data themselves.

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[4] Any standard textbook on statistics will explain this process (see F. E. Croxton and D. J. Cowden, *Applied General Statistics* [New York, Prentice-Hall, Inc., 1939], chap. xvii).

[5] *Ibid.*, pp. 500 ff.

Once a seasonal pattern has been identified, there remains the question: What can the business man do about it? There are two broad courses open to the firm in meeting the problems of seasonal variation. First, it may accept the existence of the seasonal and attempt to adjust its production and sales accordingly, or, second, it may attempt to reduce or eliminate the seasonal variation. In some instances, however, the latter course may be impossible.

There are many ways in which the firm may adjust its operations to seasonal variation, and only a few will be mentioned here. If there is a seasonal pattern in production, steps may be taken to spread production over a longer period. If the product is highly standardized, durable, not subject to fashion change, and can be stored at small expense, there is the possibility of building up inventories in off-peak consumption periods. This involves a forecast of the amount of the seasonal fluctuation. If such a forecast is successful, the accumulation of inventory may result in reduced costs. Where production is highly seasonal, so that a large amount of labor is demanded at peak periods and is laid off during periods of low production, the firm is somewhat at the mercy of the labor market. It must take what labor is left over after all continuous employment is satisfied. If the firm is able to operate over longer periods, productivity may increase so that costs may actually decline. Such inventory accumulation, however, is not possible with many goods which are subject to fashion change, spoilage, etc. There is the case of a large farm equipment manufacturer who, for many years, concentrated his production in that period of the year when his sales were at their seasonal high and operated at a relatively low level the remainder of the year. Since his products were relatively bulky and of high unit cost, there was considerable expense in storage and investment in inventory. He partially solved his problem by offering substantial discounts to dealers in periods of off-peak sales. This meant that his dealer organization carried a large part of the inventory and purchased at off-peak seasons so that he was able to operate on a more continuous basis.

Another method of adjusting to a seasonal pattern in production or sales is diversification of product so that the firm is in more or less continuous operation throughout the year. This means that products with different seasonal patterns are dovetailed so that the peaks and troughs of seasonals fall between one another rather than coincide. In many cases this may be done by the addition of a product which may be produced during off-peak periods of the year. This solution is not always so simple as it appears. When another product is added to the line, a seasonality different from that of existing production is not the sole consideration. It must be a product which can be adapted to production by existing equipment with a minimum of conversion costs. Preferably it should be a product that requires materials which can be purchased through existing channels and also marketed through existing distribution outlets. Otherwise the expenses of production and distribution may make the product unprofitable. The more that existing equipment can be used throughout the year, the lower will be the average unit charge of depreciation and maintenance so that the addition of a contra-seasonal product may permit of an over-all unit cost reduction. This leveling-out of operations may also be accomplished by the production of a product for some other firm during off-season periods. This may be of value where the product can be produced with existing equipment and labor force but where the marketing problems are substantially different from those of the firm's present line of goods.

Efforts may be made to change consumer buying habits in order to eliminate seasonal variation, but this is a most ambitious undertaking. Where consumption is seasonal because of custom or tradition, it is almost impossible to modify, but in some cases it has been done. The use of advertising to this end is sometimes successful. One large insurance company writing automobile liability insurance controls the timing of renewals by assigning expiration dates on a regional basis. This avoids "bunching" of renewals at certain times of the year which formerly coincided with the seasonal sales pattern of automobiles. Every firm, however, does not possess such control of its sales. The individual firm can do little in this respect other than to encourage buying in off-season periods. This may be done by regular sales in the off-peak season, such as the January and August "White Sales" in many department stores. These sales, if successful, will tend to alleviate the seasonal fluctuations for two possible reasons. First, since such sales become regular events, some customers may shift from the peak buying season to the sales during off-peak seasons. This has the effect of lowering the seasonal peak and raising the off-season trough. Second, the sale may attract customers who are not regular customers at other times of the year. This tends also to raise the off-season trough and thus alleviate the seasonal pattern. The purpose of a sale in off-season periods may not regularize actual consumption, but it may shift the carrying of inventories from the seller to the buyer. Where consumption is on a seasonal basis because of the weather, little can be done to alter the pattern. The only way to eliminate seasonal variation is to eliminate the cause, and this may be beyond the control of the firm in many cases.

The forecast of seasonal variation is not an easy and simple matter. While it may be measured as explained above, these measurements are subject to some bias and require qualitative information to supplement them. Quantitative information is valuable, however, in that it records changes from one period to another, and when a departure from the seasonal behavior is observed it is a warning to seek an explanation as to why it occurred. After a seasonal index has been computed, it should be kept in mind that a forecast on these data should allow for other factors to affect the expected level of activity. The timing of a seasonal may be affected in many ways. A protracted drouth may delay or speed up the harvesting of crops. A mild fall and winter season may cause consumers to postpone the purchase of winter clothing. Unseasonably warm weather may also permit construction activity to be carried further into the winter than originally anticipated. In the Chicago area in the fall of 1948, there was an unusually mild season. Homes equipped with storage facilities had failed to acquire stocks of fuel in the late summer, as had been the custom. As a result, the sales of fuel oil and coal were below the amount indicated by the seasonal index. While this decline was attributed to unseasonable weather, it could also have been due, to some extent, to the lack of funds on the part of individuals to purchase large quantities of fuel in advance. The tendencies of buyers to hoard in anticipation of scarcity of supply may interrupt the usual pattern of seasonal variation.

In any case, where a seasonal pattern is present, the businessman should attempt to determine its cause and whether or not it is beyond his control. Where it cannot be eliminated or modified, he should attempt to forecast the amount of the variation expected, using his past experience as shown by his own and supplementary data, together with qualitative allowances which may affect the future level of the variation. Random events, together with cyclical and trend factors, will affect the absolute level of his business activity at any particular time.

CYCLICAL FLUCTUATIONS

Cyclical fluctuations differ from seasonal variations in many respects. While seasonal behavior is associated with the calendar year or some specified twelve-month period of time, cyclical behavior is associated with varying periods of time which are far less predictable. Causes of cyclical fluctuations are not confined to weather and custom. These fluctuations vary in length from one to twelve years and are far more difficult to predict than seasonal behavior.

The measurement of cyclical behavior is conventionally achieved by fitting a trend line to seasonally adjusted data and then computing the percentage deviation of the adjusted data from the trend. Since both the seasonal and the trend factors have been eliminated, the results show cyclical fluctuation around the trend. Unfortunately, however, this method of statistical measurement of cyclical behavior includes fluctuation due to random events. The method is one of a "process of elimination," but, since we have not eliminated the effects of random events previously, they are included in the cyclical fluctuations. There is no known method of quantitative measurement of random fluctuations. The best that can be achieved is the use of the above method with allowances for random fluctuations. Such fluctuations do not arise directly from causes inherent in the economic system but from such causes as a strike or prolonged shutdown in some particular industry.[4] In the interpretation of statistical data it is important that qualitative factors be used to explain some of the fluctuations which statistical devices lump together with cyclical fluctuations.

The averaging of data from several economic series into an index number for the purpose of measuring general or over-all cyclical fluctuations is also beset with many difficulties. The problems of accuracy, weighting, and bias of index numbers influence the reliability of the results. Over-all indexes of economic activity are somewhat crude, but even in such investigations there is ample evidence of recurring periods of good and bad times.

Exhibit 3 shows cyclical fluctuations in the United States from 1790 to 1949. Several series are shown on this chart, and cyclical behavior is present in all of them. It is to be noted that the line around which the series fluctuate is horizontal. This is because the measurements shown are those described in the preceding paragraph, i.e., percentage deviations from trend. This chart, therefore, reveals nothing as regards long-term trend. It should be noted that these cyclical movements are erratic in all phases of the cycle. The upward movements, for example, are not smooth but consist of a series of relatively short upward and downward movements within the cyclical movement itself. The cyclical movement is in spurts rather than a smooth continuous line. Likewise in the downward cyclical movements we find short periods when the movement may be upward for a short period of time. This indicates that during periods of upswing or downswing there are interrupting movements in the opposite direction which are not of sufficient magnitude to change the direction of the cyclical movement itself. This has raised a great deal of discussion as to whether there are several kinds of cyclical fluctuations going on at the same time or whether there is only a single cycle, of which the minor movements are only a part.[7]

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[4] The Hawaiian dock strike from May to October, 1949, is an example.

Further examination of Exhibit 3 indicates that not all the movements upward and downward are smooth but rather tend to move irregularly in jerks or spurts. This lends support to the thesis that the factors causing these irregular movements are not identical with those responsible for the entire cycle from peak to peak or trough to trough. Professor Hansen has classified the peak-to-peak movements as "major" and the irregular movements as "minor" cycles.[8] That is the classification which will be used here. He states:

> Quite commonly . . . the term "business cycle" is applied with reference both to what is called the minor cycle and to the major cycle. . . . Particularly in the upswing of the major cycle, there regularly occurs . . . one or sometimes two interruptions to the upswing movement. In seven of the fifteen major cycles in the period from 1807 to 1937 there were two minor recessions, and in eight of the major upswings there was one minor recession. Since 1883, out of six major cycles two were interrupted by two minor recessions and four by one minor recession. . . . It is to be noted that very rarely do minor upswings interrupt the downswing of the major cycle. . . . The major cycles vary in length from a minimum of six years to a maximum of twelve years, though with rare exceptions

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[7] For contrasting views see Joseph H. Schumpeter, *Business Cycles* (New York: McGraw-Hill Book Co., Inc., 1939); and Edwin Frickey, *Economic Fluctuations in the United States* (Cambridge, Mass.: Harvard University Press, 1944).

[8] Alvin H. Hansen, *Fiscal Policy and Business Cycles* (New York: W. W. Norton & Co., Inc., 1941), p. 16.

*Exhibit 3**

CHART OF ECONOMIC FLUCTUATIONS, 1790-1949

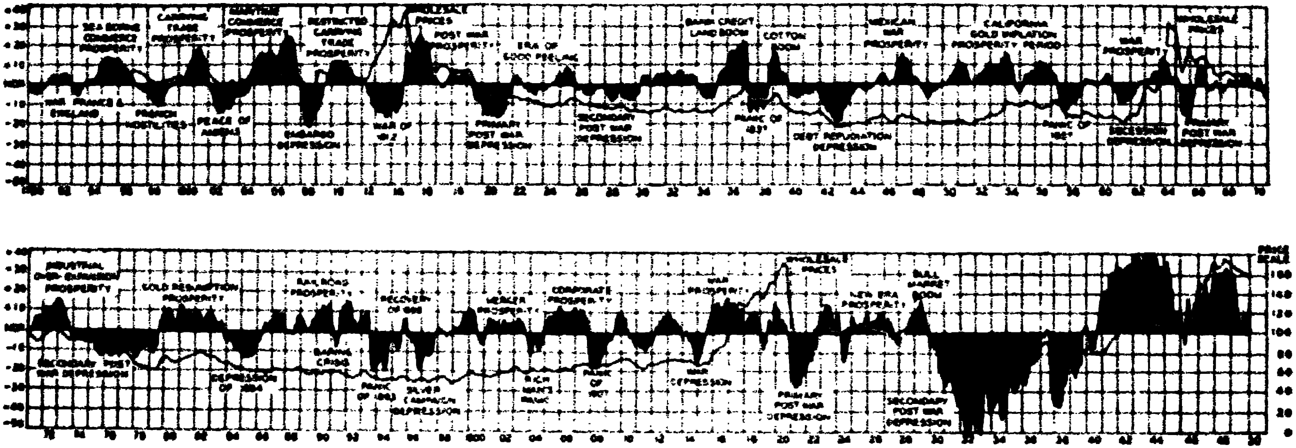

*Exhibit 3—Continued**

The index is composed of one set of 10 series of annual data from 1790 to 1855, and of another set of 10 series of annual data from 1855 to 1901. The fluctuations above and below normal were computed for each series separately, and the 10 were then combined in one. Normal values for each series were means between one set of lines running from one prosperity peak to the next, and another similar set of lines running from each depression bottom to the next. The annual figures from 1901 to 1919 are those of the Thomas index of manufacturing production with mineral production added, and from 1919 to 1940 the monthly figures of the Federal Reserve (Thomas) index of industrial production were originally used. All the data were reduced to a per capita basis.

The computations of the fluctuations of each of the 10 series constituting the index from 1855 to 1901 were carried through to include 1930, and the coefficient of correlation between each of them and the production series running from 1901 through 1930 was computed. Their deviations were then multiplied through by constants so as to equate their amplitudes of cyclical fluctuation. Each of the 10 series was then given a weight based on its degree of correlation with the production series, and with these weightings they were combined into a single index. The 10 series with these weights are: pig-iron consumption, 15; railroad freight ton miles, 15; cotton consumption, 14; canal freight (New York and Sault Ste. Marie), 12; coal production, 12; construction of miles of new railroads, 12; blast-furnace activity, 10; rail production, 6; locomotive production, 2; and ship construction, 2. The 10 series combined gave results closely similar to those of the production series for the overlap period from 1901 through 1930. The heights of prosperities and the depths of depressions were closely alike in the two series. The coefficient of correlation for the period was .95. Their average deviations for the period were equal.

In a similar way the computations of the fluctuations of each of the 10 series constituting the index from 1790 to 1855 were carried through to include 1882, and the coefficient of correlation between each of them and the first 28 years of the index running from 1855 to 1901 was computed. Their deviations were then multiplied through by constants so as to equate their amplitudes of cyclical fluctuation. Each of the 10 series was then given a weight based on its degree of correlation with the first 28 years of the index from 1855 to 1901, and with these weightings they were combined into a single index. The 10 series with these weights are: commodity prices, 20; imports, 18; imports retained for consumption, 18; government receipts, 14; ship construction, 12; government expenditures, 6; coal production, 6; exports, 5; iron exports, 2; and tons of registered shipping in service, 1. The 10 series combined give results closely similar to those of the other index for the overlap period from 1855 through 1882. The heights of prosperities and the depths of depressions are closely alike in the two series. The coefficient of correlation for the period is .90. Their average deviations for the period are equal.

When the annual data were determined, the monthly data were fitted to them. These monthly data were based on the figures of the business index of the American Telephone and Telegraph Company and on data for blast-furnace activity from 1877 to 1919. Monthly data for bank clearings and for stock prices were used from 1861 to 1877, and those for security and commodity prices from 1815 to 1861. From 1790 to 1815 the monthly data are based on commodity prices. In 1940 the data of a new index of industrial production computed by the Cleveland Trust Company were substituted for those of the Federal Reserve index of industrial production, and the new figures are used from January, 1923, to date.

The curve represents the changes in wholesale commodity prices. The index used is that of Professors Warren and Pearson (Cornell) and that of the Bureau of Labor Statistics, recomputed so that the average for 1929 equals 100. This series was used from 1798 to date. From 1795 to 1798 the Smith series was used, and from 1790 to 1795 a British price index was used.

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they fall within the range of seven to ten years, the average being slightly over eight years. The minor cycles have a range of from a minimum of two years to a maximum of six years, though they usually fall within the range of three to four years with the average slightly over three and one-third years.[9]

The existence of a minor cycle has been most frequently associated with the accumulation and reduction of inventories. The theory is that, as an increase in business activity occurs, manufacturers, distributors, wholesalers, and retailers attempt to increase their inventories to maintain some sort of ratio between inventories and sales. This means that the absolute volume of inventories all along the line in the distribution process must rise with an increase in the volume of sales. The net result is an increase in the production of goods greater than the real increase in demand on the part of consumers. As the increase in demand levels off and merchants and manufacturers achieve the desired ratio between inventories and sales, that part of the demand for additional goods which was used to maintain this ratio disappears, and the result is a decline in the manufacturing industries producing these goods. Manufacturing activity is then confined to meeting the current demand of consumers. Should sales show a decline, merchants attempt to trim the absolute volume of their inventories to maintain the desired inventory-sales ratio, and the net effect is to refrain from purchasing additional inventories until current inventories have been reduced to bring them into line with the lower level of sales. Manufacturers then cease production entirely or sharply curtail output until merchants again begin to buy to meet current demand or until sales begin to rise again and thus begin a repetition of the entire cycle. While this thesis explains why manufacturing activity tends to rise and fall according to inventory demands of merchants, it does not explain why sales by merchants rise and fall. This problem will be discussed below under the major cycle.

If the inventory explanation of the minor cycle is accepted, then in the short run the attention of the businessman is focused upon watching inventories in relation to sales. Since it is not always possible to distinguish a minor cycle from a major cycle, inventory policy must be co-ordinated with factors associated with the major cycle. The major cycle bears upon other policies of the firm, such as capital investment, depreciation policy, price policy, selling policy, personnel policy, and similar decisions affecting the future of the firm. This means that the businessman must make a forecast covering a period longer than short-run inventory adjustments, and, in order to do this, he must be able to identify the phase of the cycle in which he finds himself.

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[9] *Ibid.*, pp. 16–19, *passim*.

Phases of the Cycle

A major business cycle passes through four phases of development: depression, revival, prosperity, and recession. These periods are not identical in length. In any given cycle the depression period may be long relative to the period of recovery and prosperity. In another cycle the relationship may be the reverse. There is no clear line of demarcation between the end of one phase and the beginning of the next. The transition from one phase to another may or may not be abrupt and is not always easily discernible. In spite of the difficulties of observation and measurement, it is helpful to divide the cycle into these four phases for study and investigation.

During the *depression* phase of the cycle, production has been reduced to meet hand-to-mouth buying policies of consumers, unemployment is large, costs of both labor and materials have fallen in relation to selling prices, interest rates are low, banks have larger reserves, and the desire to hold cash rather than other forms of wealth is high. Those factors which have refused to accept lower compensation in relation to selling prices of their products are unemployed while others may be employed at lower rates. Purchases have been confined to necessities; those goods which have durability have been pressed into longer service. The economy is at "rock bottom." The outlook for the future is not bright, and businessmen are unwilling to make long-term commitments. In fact, they may attempt to scale down some of their burdensome fixed charges which were incurred during more prosperous times. Little or no new equipment is purchased other than for replacement. This does not mean, however, that no expansion whatever occurs during depression. Some businessmen may look upon the depression as an opportunity to prepare for better business in the future and engage in additions to plant and equipment while the costs of such construction are low relative to expected future prices. There are also some industries which may be enjoying a relative degree of prosperity during depression. Such was the development of rayon and rayon fabrics during the depression of the early thirties. Other than such exceptions, however, economic activity is at a minimum consistent with current demand.

Eventually, during a depression period, machinery will wear out and will have to be replaced. Or possibly some new invention or improvement will stimulate demand for goods and services. An announced policy of government spending may cause a change in attitude which will bring about increased expenditures and thus cause an increase in general business activity. Whatever the cause for increased optimism on the part of consumers and businessmen which increases expenditures, once the *revival* is begun, it tends to grow at an increasing rate. With the increase in optimism, businessmen begin to anticipate that future prices will be in excess of current costs or expected future costs and thus profit prospects increase. This results in placing orders for new equipment and replacement of old. Inventories must be replenished and increased to keep pace with increased demand. Durable goods whose purchase was postponed during the depression are now more eagerly sought. Employment increases, bank loans increase, and, as the prosperity phase is entered, bottlenecks begin to appear in many lines, resulting in sharply rising prices. The growth in economic activity continues at an accelerating rate. These developments are characteristic of the period of recovery.

The period of *prosperity* is marked by high profits, high employment, rising prices, rising costs and wages, rising interest rates, and a high level of demand. As the prosperity continues, costs tend to catch up with prices, and profit margins begin to diminish, the rate of increase in demand for many goods tends to decline, supply begins to catch up with demand as bottlenecks disappear, and a general feeling of uneasiness begins to spread over the business atmosphere. Inventories are high and, as some unemployment or threat of unemployment begins to appear, the outlook for the future dims, and the rate of spending on the part of both consumers and businessmen tends to decline. As profit margins tend to decline, businessmen are less inclined to risk investment in operations which will not be productive until some future date. Interest rates tend to rise, prices tend to level off, and there is a fear that they may decline and result in some losses, so that the optimism of prosperity fades into pessimism and a period of recession sets in.

The period of *recession* is marked by many adjustments or attempts to adjust to the changing situation. Banks become more concerned about their outstanding loans and call them in or refuse extensions as credit risks become more hazardous. Businessmen attempt to cut costs wherever possible and also to reduce prices in order to hold their trade. Some prices are sticky and do not fall rapidly, and this usually results in speeding up the increase in unemployment. Plans for expansion are canceled, and durable goods which still have useful lives are retained in use or placed in idleness so that their replacement or repair is postponed. Current demand is met largely from inventory. People tend to hold onto money rather than spend it. This behavior leads toward depression, and the cycle is complete.

Security prices generally tend to reflect business conditions and hence fluctuate with movements in economic activity. The movement in security prices is not always parallel to business activity. In the summer and fall of 1929 security prices were highly inflated, while prices of manufactured goods and services and wages did not exhibit such an inflation. The general level of economic activity rose during the twenties, but stock prices rose proportionately more. Again in the recovery of the thirties and the recession of 1937, security prices tended to vary with general economic activity. Such has not been the case since the end of World War II, however. The relationship of security prices, particularly common stocks, to the general level of economic activity has been difficult to establish. While employment, profits, sales, and prices have risen and remained at high levels, no definite trend is yet discernible in the price of equity shares. Although one would expect the securities market to reflect general business conditions, it has not proved dependable as an indicator of present or future events.

BUSINESS-CYCLE THEORIES

The occurrence of business cycles has been attributed to a variety of causes. Earlier theories of business fluctuations tended to assign one particular factor or group of factors as the primary cause of cyclical behavior. This implied that control of this single or particular group of factors would eliminate the cycle. Business cycles have been unique, in that the combination of forces which brings them about is rarely the same. The same set of forces may be present but with varying importance. Business-cycle investigations, therefore, have subsequently developed less rigid theories and placed greater emphasis upon the varying relationships of these forces. Few contemporary students of the cycle would accept an explanation of the business cycle in terms of a single causal factor. The more rigid theories have made their contribution to the development of cycle theory and for that reason will be discussed briefly below. The decline in importance of some of these theories is not due to their outright rejection but perhaps to either a lack of statistical data to verify them or the rise in relative importance of other contributing causes.

Theories of business cycles may be divided into two broad classifications: exogenous and endogenous. *Exogenous* theories are those which attribute the occurrence of economic fluctuations to causes originating outside the economic system itself. Phenomena foreign to the economic system occur, and the system then attempts to adjust to them. The adjustments either increase or decrease the level of economic activity. The outbreak of war, for example, is considered to be outside the economic system, but its impact upon the economy is rather impressive. *Endogenous* theories attribute the cause of cyclical behavior to phenomena inherent in the economic system. Institutional factors play an important part in this theory. Strict classification of these theories is not always simple. For example, one may ask whether the issuance of a government regulation is an event within or without the economic system. Depending upon its nature, it may be placed more easily in one classification than in another. This will become more apparent as the theories are discussed. The placing of a theory in one category for the purpose of discussion does not exclude it from the other. The theories discussed below are classified as follows:

Exogenous theories
- Sunspot and weather
- Crop yield
- Innovation
- War

Endogenous theories:
- Profit
- Monetary and credit
- Nonmonetary
- Overinvestment
- Underconsumption

Sunspot and Weather Theories

Various attempts have been made to relate the fluctuations in business activity to the appearance and disappearance of sunspots. The earlier theories traced the effect of sunspots upon the weather, which, in turn, affected crop yields, and this, in turn, affected the level of business activity. Both W. S. Jevons and H. L. Moore supported this theory with some slight variations in their respective developments. Jevons noted the appearance of sunspot cycles which coincided with business cycles from 1815 to 1857. Later data did not support this theory, and it was practically forgotten until the middle 1930's, when the theory was again revived. This later theory suggests a relationship between human energy and sunspots. Sunspots, which appear in cycles, tend to affect climatic conditions, and this effect is transmitted into cycles in the level of human activity, which, in turn, affects economic activity. According to this theory, when we feel ambitious and energetic from solar stimulation, we apply ourselves with more vigor to our daily activities, and this causes a speeding-up of economic activity. As our energy wanes and we become lethargic, we are less efficient and careless, and hence economic activity declines. Another variation of the theory is that the increase in bright areas on the surface of the sun cause an increase in the ultraviolet rays reaching the earth. This stimulates us to think more clearly, act more energetically, and thus causes the level of economic activity to rise. As these bright areas disappear, as a result of an increase in the number of sunspots we have a decline in human performance, with a resulting decline in economic activity. This has led one writer on the subject to suggest that, if this thesis be correct, we could eliminate business cycles by means of ultraviolet ray lamps.[9]

Because of failure of correlation between sunspot and business cycles and failure to establish a more certain line of causal relationships between the effects of solar radiation and ultraviolet rays upon the human body, little acceptance has been given to these theories. For that reason they play no part in the forecasting of future economic conditions by the businessman. Until such time as more empirical knowledge is available concerning the effects of sunspots upon human activity, these theories avail us little as to the causes of business fluctuations.

Crop-Yield Theory

This theory is closely associated with variations in the weather and climatic conditions. Weather affects crop yields, and this, in turn, affects economic conditions. Earlier theories of this type held that a large yield of agricultural products heralded a period of prosperity, while crop failures meant depression. In a society which is largely agricultural a positive correlation of this type may well prevail, but in modern industrial nations it is not clear as to whether the correlation is positive or negative. That is to say, there is the difficulty, in modern times, as to whether high or low yields are associated with prosperity or depression. There was the decade of the 1920's, which is historically recorded as a period of prosperity; but during this time agricultural prices and income were declining relative to other prices and incomes. In the earlier part of the 1930's there was depression in both agricultural and industrial spheres of the nation's economy, although crop yields were high.

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[9] Elmer C. Bratt, *Business Cycles and Forecasting* (Chicago: Richard D. Irwin, Inc., 1948), p. 165.

There are observable fluctuations in agricultural output which move in cyclical fashion, but there is little correlation between agricultural cycles and those of industrial production. There are statistical difficulties present in measurement of agricultural cycles similar to those in industrial production. The cycle, or variation, in output of agricultural products is not the same for all products. It is difficult to identify *the* agricultural cycle.

While there is little relationship between general fluctuations in crop yields and industrial production, there is rather close positive correlation between agricultural prices and industrial activity. This correlation has led some to jump to the conclusion that low agricultural prices are the cause of low industrial activity. Supporters of the farm price-support program imply such a theory frequently in their arguments that there can be no prosperity for all unless the farmers are prosperous. The relationship between agricultural prices and industrial activity is rather complex. Some writers have argued that industrial activity affects agricultural prices. This theory is just the reverse of that which argues that changes in agricultural output cause business cycles. This group contends that the rise of industrial prices and wages increases the income of those employed in industry. Because of increased incomes, the demand for agricultural products increases and results in increased prices for these products. This position, however, is valid only on the assumption that the supply of agricultural products is inelastic in the short run and that some of the increased incomes of industrial workers will be spent on additional agricultural products. This theory removes all causal effects from the agricultural sector of the economy and makes prices of agricultural products dependent upon the price and output level of the industrial sector of the economy. Perhaps the chief reason for this position is the assumption that agriculture plays a role in total economic activity relatively minor to that of industrial activity.

Of chief importance to the businessman is the relationship of the prices of his raw materials and end products in relation to agricultural income rather than the over-all relationship of fluctuations in agricultural output and prices to industrial activity. An increase in crop yields will cause a decline in agricultural prices if the demand curve for such produce is negatively inclined and does not shift. An increase in the yield of corn, for example, will cause a decline in the cost of producing starch and glucose under this assumption. It is possible, if the demand for starch and glucose products is elastic, that a reduction in their prices will so increase volume as to increase demand for corn and thus maintain or increase its price in spite of the larger yield. Where agricultural products may be easily substituted for one another, the relationship between yield and prices becomes more complex. Such is the situation in the use of vegetable oils which are derived from cottonseed, soybeans, flax, and other agricultural produce. An increase in the yield of one of these products with no change in yield of the others may cause a decline in the price of all. The effect of these price changes upon over-all economic activity depends upon the importance of these products in the economy.

Crop yields, while they affect the level and nature of economic activity, do not furnish an adequate explanation of business cycles. They are more in the nature of contributing causes than a total explanation. The businessman would do well to acquaint himself with the effect of crop yields and agricultural prices both upon the total level of economic activity and upon his particular industry and firm. It is suggested that he not depend upon fluctuations in agricultural output and prices as a barometer of general economic activity.

Innovation Theory

According to this explanation, business cycles are the results of inventions and their subsequent economic exploitation. This theory was developed by the late Professor Schumpeter as a corollary to his theory of innovation profits.[11] The thesis maintains that, when an entrepreneur makes a discovery of new products or methods, he is imitated by other entrepreneurs as quickly as they are able to acquire knowledge of the product or process. A new discovery calls for new productive capacity or modification of the old. This means an addition to physical output, the employment of more labor, an increase in spending, and the supply of goods must therefore increase to meet the greater demand for old as well as new products. This causes a cumulative period of expansion of production of both capital and consumer goods. The increase in demand causes a rise in prices which increases profit prospects. This induces other entrepreneurs to enter the market and thus add to the demand for new productive resources.

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[11] See Part I, pp. 17–19

This theory is more complete than the preceding one, in that it offers an explanation for depression as well as prosperity. As new entrepreneurs enter an industry, the profits of the industry tend to decline. New entrepreneurs increase the supply of goods relative to demand, and prices fall. With falling prices and diminishing volume of output per seller, costs rise, and profits decline to the point where no new entrepreneurs are attracted into the industry. This causes the demand for productive facilities to decline, and unemployment occurs in those industries formerly supplying this demand. This means a reduction in consumer expenditure, which reduces profits even further and possibly causes some entrepreneurs to suffer losses. This turns into a downward movement in which attempts are made to reduce costs, and the movement becomes cumulative in a downward direction. This downward movement will continue until there is a sufficient reduction in the number of firms to permit the earning of "normal" profits.

Unless there is a new discovery, it is presumed that the period of depression will continue indefinitely. Prosperity, under this theory, depends upon a continuous series of inventions or innovations. If the inventions or innovations are evenly spaced and have equal expansionary effects, there will be a continuous period of prosperity. If, on the other hand, the inventions are bunched at irregular intervals, there will be periods of expansion and contraction. Professor Schumpeter's explanation of the business cycle is based on the assumption that inventions are bunched and hence the periods of prosperity and depression. One of the reasons for this apparent bunching, he explains, is that an invention or discovery of a new product or process by one entrepreneur causes competitors to strengthen their efforts to copy the original discovery or produce sufficiently close substitutes so that there is an increase in demand for the factors of production. This is transformed into an increase in the level of economic activity. These inventions and discoveries are usually looked upon as events outside the economic system, and their appearance tends to set up reactions within the system.

There is strong historical support for this theory. Professor Schumpeter pointed to the era of railroad building following the Civil War. This boom reached its highest point during the 1880's and was followed by a boom in suburban electric railways. This boom reached its peak about 1910 but was followed by the development of the automobile in the second and third decades of this century. The discoveries in each of these industries caused the concurrent growth and expansion of affiliated industries, such as chemical, rubber, glass, steel, and construction. The chief weakness of the theory is that it does not account for the minor fluctuations which occurred during the long up- and downswings in each of the innovating periods. They may be placed in the category of adjustments, but, as such, they are not predictable under this theory. This theory also demands no periodicity of economic behavior, since all stimuli come from outside the system. This is a very important theory for specific industries, such as the radio industry during the 1920's, and the television industry at present. Technological change has an impact upon economic activity and affects all industries in various degrees. This factor must be taken into account by the businessman in making forecasts of future economic developments. It is a factor to be considered, although it is not submissive to statistical measurement as are some other economic variables.

War

While there are some who offer war as an explanation of business cycles, it is more in the category of a random cause. However, it does have far-reaching effects upon the economic system which go beyond the duration of war itself. The outbreak of war interferes with the direction of movement of economic activity. A belligerent nation must sharply increase its productive capacity so as to increase its output of war materials. Such activity usually causes increases in the money supply and in prices, and frequently it brings the arbitrary allocation of economic resources. There are accompanying developments which affect economic activity for a considerable period into the future. The birth rate, and hence the population, increase. Also there may be considerable migration from other nations to augment the labor supply. Foreign labor is attracted by higher wages and may move if not restricted. Because of increased demands for skilled labor, training must be given in various trades and skills. The increased population, larger trained labor supply, and increased productive capacity exist after the war and will affect the level of business activity. These are factors to be considered when there is some postwar planning undertaken during a war.

As for war causing business cycles, the explanations offered are more in the nature of an explanation of depressions rather than the complete cycle. Because of the increase in money incomes during the war, together with a restriction on civilian goods, savings accumulate which will be spent when the war ends and conversion to civilian production takes place. There is a vast pent-up demand awaiting satisfaction. In the postwar period there is a great effort to expand and satisfy this demand. The rate of production is such that it must satisfy not only the accumulated demand but also current demand plus normal growth. Once the accumulated demand is satisfied, there remains only current and normal growth demand, so that all the productive capacity required in the immediate postwar period is no longer needed. There results a decline in both capital- and consumer-goods industries, with resulting unemployment and declining prices. Economic activity must decline and will not turn upward until productive capacities and inventories are depleted or until some random event (such as war) again artificially stimulates the demand for more goods.

Profit Theory

This theory places emphasis upon the role of the entrepreneur. It is he who makes decisions to hire resources and enter into production with the expectation of making a profit. When entrepreneurs anticipate that the margin between cost and price will increase, or at least remain stable, they expand output in the hope of obtaining increased profits. Increasing profits increase the optimism of the businessman. In an atmosphere of optimism both businessmen and consumers tend to spend freely. This calls forth increased supply to meet the additional demand, and the level of economic activity continues upward at an increasing rate.

All changes in prices, costs, expenditures, money, and credit are interpreted by the businessman as to their effect upon future profits. A fall in prices means a reduction in profits, unless costs fall proportionately, so that future activity is curtailed. An increase in the interest rate affects future profits, other things being equal, and the businessman adjusts his plans accordingly. Profits play the central role in this theory. Whatever occurs to brighten profit prospects causes an upturn, and when the outlook for profits is dim, business activity is curtailed. Hence the cyclical swings in economic activity. While this theory explains the reactions of the businessman to changes in the economic system, it does not explain why these changes occur. The theory is really psychological in nature. Profits —that is, expected profits—determine the mood of the businessman, and the expansion and contractions of economic activity are directly correlated to his optimism and pessimism respectively.

Professor A. C. Pigou has contributed greatly to the psychological explanations of the business cycle in his book on *Industrial Fluctuations.*[12] He points out that economic fluctuations occur because of waves of optimism and pessimism. The businessman is dealing with the future in his decisions, and this introduces the element of uncertainty. The businessman assumes risks when dealing with the future, and the assumption of risks introduces the possibility of error. In a period of optimism businessmen make decisions as to the prospect of future profits and enter into commitments. As the future develops into the present, the businessman is able to ascertain whether he correctly estimated his risk. If he did so, he is optimistic and either stabilizes his activity or continues expansion, but if he discovers that he was in error and overestimated his possibilities, he becomes pessimistic and attempts to correct his error. This leads to contraction, and, if such an attitude is general, a period of depression sets in.

The profit theory, along with other psychological theories, does not concern itself with the problems discussed in the theories below, such as overinvestment, underconsumption, and economic maladjustments. The turning points from prosperity to depression and vice versa are explained in terms of the attitudes of the businessman. Professor Haberler states on this point: "The psychological theories as such are not concerned with specific assumptions as to the nature of the maladjustment which brings about the collapse of the boom. The result of the optimistic error with which the psychological theories are concerned may be shortage of capital, insufficiency of consumers' demand or horizontal misdirection of capital; the 'psychological' theory is compatible with any or all of these hypotheses."[13] The psychological theories are of value to the businessman in that, if businessmen as a group are optimistic or pessimistic, there is a tendency for their expectations to develop. That is to say, if businessmen generally expect that demand will decline in the future and restrict their plans for expansion or cancel them entirely and restrict output in the present, such action will bring about a reduction in the level of consumer income and hence a decline in demand. In a society motivated by profit it is essential that the businessman take the psychological factor into account.

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[12] A. C. Pigou, *Industrial Fluctuations* (2d ed.; London: Macmillan & Co., Ltd., 1929), chap. vii.

[13] G. Haberler, *Prosperity and Depression* (Geneva: League of Nations, 1941), p. 150.

Monetary and Credit Theory

This theory attempts to explain cyclical fluctuations solely in terms of expansion and contraction of the money flows from producer to consumer and back to producer. According to the exponents of this theory, bank credit (deposits) plays a large role in our society as the medium of exchange, and it is primarily the expansion and contraction of bank credit which is responsible for the change in economic activity. In periods of prosperity prices rise, the physical quantity of goods sold increases, resulting in a rise in the total volume of money transactions. Unless the existing money supply turns over at a more rapid rate or the supply of money is increased, there can be no price rise. In this theory the causal factor in a period of rising prices is the increase in money supply, together with a possible change in the rate or turnover of money. In periods of depression the volume of transactions and prices both fall. The supply of money is contracted or the rate of turnover declines or a combination of the two occurs. Existing supplies of goods cannot be purchased at their original prices with a decreased money supply. Hence the price level must fall, and this initiates a downward movement. While it is true that the institutional organization of our banking system plays an important role in economic activity, the extent to which it brings about economic fluctuations does not enjoy unanimous agreement. There can be little doubt, however, that our monetary system is a conditioning factor, if not a positive force.

The most detailed monetary theory of the cycle has been offered by Mr. R. G. Hawtrey.[14] His theory is summarized below as typical of this explanation of the business cycle. Great emphasis is placed upon the role of the trader or merchant and the banking system in economic activity. His actions are primarily influenced by consumer outlay, which is defined as the total expenditure on both consumer goods and investment goods, that is, the part of consumers' incomes which is saved and invested. All phenomena which affect economic activity, exogenous or endogenous, transmit their effects by means of an increase or decrease in consumer outlays.

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[14] R. G. Hawtrey, *The Art of Central Banking* (London: Longmans, Green & Co., 1932).

The cause of a change in consumer outlay is a change in the quantity of money. A decrease in the quantity of money of appreciable proportions causes a decline in the demand for goods. Merchants who have purchased goods in anticipation of demand prior to the decrease in money supply are unable to dispose of their inventories at expected prices. They curtail or cancel existing orders with producers, who then face the same problem. Stocks accumulate, losses occur, production falls, unemployment increases, and a period of stagnation appears and continues until prices, including wages, are adjusted downward to permit the sale of the goods at prices which the new level of money supply will support. Thus a period of depression is one in which there is a fall in consumer outlay, and a period of prosperity is one in which there is an increase in consumer outlay.

The role of the banking system in this theory is the expansion and contraction of credit. The creation of credit (bank deposits) and the regulation of its amount are under the control of the banking system. The instruments of control are the discount rate and the purchase and sale of securities in the open market. The lowering of the discount rate induces merchants to borrow, and an increase discourages such loans. The purchase of securities in the open market expands bank credit, and their sale contracts credit. Banks are limited in the amount of credit they may create by the reserve requirements of law and custom. Under given conditions a certain amount of cash (reserves) is necessary to support a particular amount of outstanding credit. The upper limit to credit expansion because of reserve requirements plays an important role in the explanation of the upper turning point in this theory of the business cycle. This position of the banking system is important, since it is assumed that merchants are very sensitive to changes in the discount rate, i.e., the rate is an important element of cost of operation. A reduction of the rate relative to selling prices of goods increases the profit margin, and an increase reduces the margin.

An upswing in business activity occurs when credit is expanded.

An expansion of credit occurs because the banks have high reserves in relation to outstanding deposits and are under pressure to increase loans. Loans may be increased by means of less stringent credit requirements, changes in terms of repayment, or reduction of the discount rate. Since the merchant is sensitive to changes in the interest rate, a small reduction increases his profit margin, and he borrows funds to enlarge his inventories. This means more orders for producers. Producers, in order to meet the increased orders, must increase employment. This results in enlarged consumer income and outlay. Increased demand causes the sales of merchants to rise, and, in order to maintain their customary ratio between inventory and sales, they increase their orders to the producer, which further increases consumer income and outlay and, therefore, merchants' sales. A circle of cumulative expansion is set in motion. Each time the merchant increases his orders to the producer, he borrows more funds from his bank. While the theory does not explicitly state it, one may assume that producers also increase their borrowings in order to meet the greater demand.

As the upward spiral in demand and supply continues, pressure is put upon productive resources. As resources become more fully employed, a further increase in demand for goods and services brings a response of higher prices. In order to meet higher prices, the merchant and producer must secure additional bank loans to cover increased costs. Rising prices, however, offer possibilities of inventory profits, and this further enlarges the demand for borrowed funds. Further pressure is put upon prices by pressing idle balances into service, that is to say, the rate of turnover of the money supply increases. The greater demand upon banks for additional credit puts pressure upon their reserves. Another phenomenon affecting the reserve position of the banks is that the increased volume of transactions causes a greater demand for cash on the part of consumers to finance their increased outlay. The banks are called upon to furnish this cash, and this drains their reserves into the hands of the consumers. If the banks are unable to replenish their reserves, they must take steps to combat the drain upon them from additional loans and the provision of more cash. Applications for credit are more closely scrutinized, regulations on loans become more stringent, and usually the discount rate is raised. The former means that new loans are denied, and the latter that the cost of new loans is increased.

The restriction of credit brings an end to the period of expansion and prosperity and causes a downturn to set in. When merchants and producers are unable to get additional loans, they are unable to place orders for new goods. This causes the unemployment of wage earners, and, as a result, there is a decrease in consumer outlay. The decrease in consumer outlay is caused not only by failure to increase the money supply but also by refusal of banks to grant new loans as old ones are repaid. This contraction in the money supply causes goods to remain unsold at their original prices, and the pressure to repay loans forces merchants to reduce prices in order to secure funds for repayment. This further lowers consumer incomes and subsequently consumer outlay. Furthermore, cash tends to be hoarded as workers become unemployed, and this causes a reduction in the rate of turnover of the existing money supply. As consumer outlay is reduced, so are merchants' sales and hence their needs for credit. Each movement reinforces the other, and there is a cumulative downward movement of output, incomes, and prices.

As prices and output fall, further reductions are expected, and a period of depression develops. During the depression loans are repaid or foreclosed, cash balances of consumers are spent and are subsequently returned to the banks to repay loans, and the reserve positions of the banks improves. As reserves are accumulated above the customary reserve ratio, banks are under pressure to lend, and promotional policies are followed. Discount rates which were increased during the prosperous period are lowered to encourage merchants to borrow. If this policy is not sufficiently productive, banks may purchase securities from the public. This places cash in the hands of consumers. If their cash balances become excessive, they either spend or invest it, and this increases consumer outlay and thus stimulates sales of merchants. The upward movement is again set in motion.

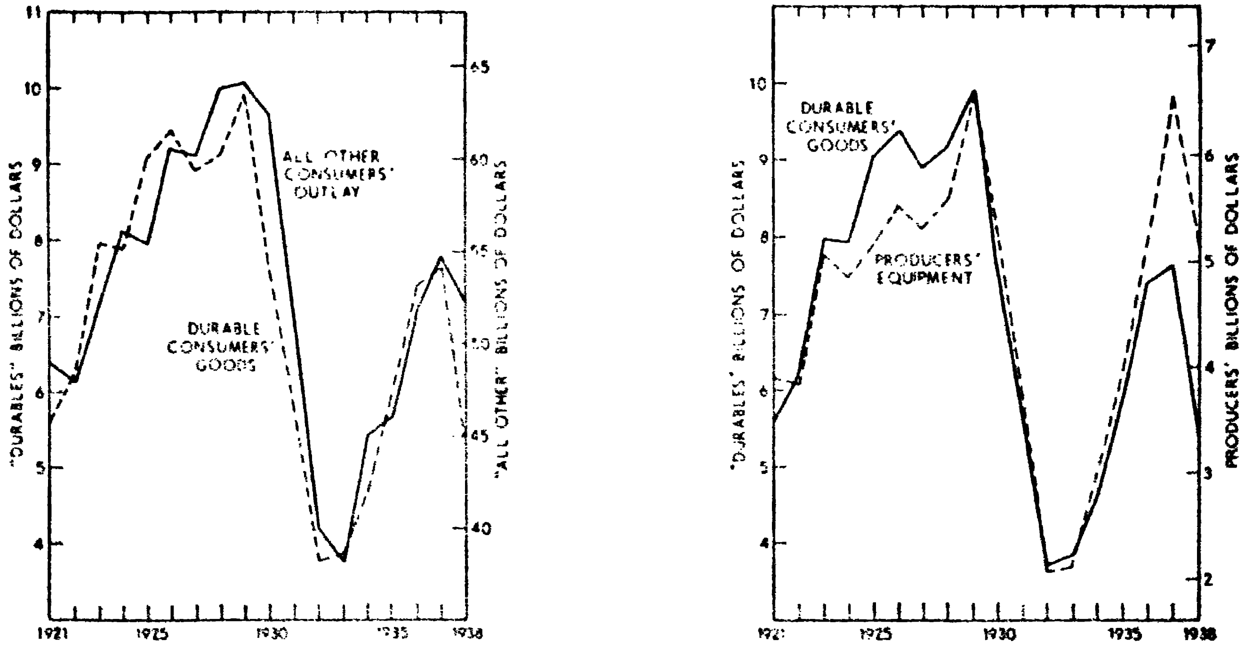
This theory suggests that the business cycle could be eliminated if banks would continue to grant credit, once the upward movement begins. It also suggests that, so long as banks are limited in the granting of credit by reserve requirements, because of either legal reasons or the institutional organization of the monetary standards, there will be fluctuations in business activity. There are not many businessmen or economists, however, who would subscribe to the theory of unlimited expansion of the money supply as a cure-all for economic fluctuations. While this theory explains the movements during a business cycle, it does not explain why all the causal events occur. The behavior of the merchants indicates some psychological reactions. The theory does contribute to the relationship between consumer outlay and the quantity of money. It also offers an explanation of the relationship between the rise in prices and the rise in the quantity of money in prosperous periods. Perhaps its greatest weakness is the heavy emphasis upon the merchant as the main factor in business activity.

Monetary Overinvestment Theory

All the overinvestment theories have the common characteristic of emphasis upon the role of investment in economic fluctuations. Under these theories the purchase of capital goods and durable consumer goods is considered an act of investment. The purchase of all other goods is classified as consumption. The industries producing capital goods and durable consumer goods exhibit greater amplitude of fluctuation in output than do those producing for current consumption. This behavior is supported by statistical data, as shown in Exhibit 4. During a period of general expansion, output of producers' and consumers' durable goods increases more, while during the downswing it decreases more, than does the output of consumption goods. This wider amplitude of fluctuation arises primarily because of overdevelopment of the durable-goods industries in prosperity. The fact that the goods are durable is the fundamental cause of this sensitivity to changes in economic conditions. Durable goods purchased today are consumed over varying periods of time, depending upon the extent of their durability. Producers' durable goods are used to produce other producers' goods or consumers' goods. They usually last for several years. Once the demand for the goods has been met, there is no further need for a continuous supply except for replacement. The same is true of consumers' durable goods. The purchase of durable goods can be postponed when occasion requires. The old machine may be repaired and used for an extra year or two instead of being replaced. The same is true of an automobile or piece of furniture

The main thesis of the argument is that during the period of expansion the capital-goods and consumer durable-goods industries are overdeveloped relative to the consumption-goods industries. There are two kinds of overdevelopment or maladjustment which

Exhibit 4



(a) (b)

Source: Alvin H. Hansen, *Fiscal Policy and Business Cycles* (New York: W. W. Norton & Co., Inc., 1941). Reproduced with permission.

may occur in the capital-goods industries. First there are *vertical* maladjustments which occur when the allocation of the factors of production to various industries does not correspond to the allocation of money expenditures for the products of the various industries. Since all income receivers necessarily spend or save all or a part of their incomes, the amount spent on consumer goods indicates the kind and quantity of consumer goods that the population desires; the amount saved indicates the amount they wish to set aside to build up the society's capital equipment, i.e., investment. In other words, if the investment undertaken by businessmen is equal to the amount saved and the amount of consumer goods produced is exactly equal to the amount demanded, there are no maladjustments in the economy. This harmonious adjustment can be preserved only if the consumption goods produced are in accord with consumer preferences as to quantity, quality, and variety. A second essential condition is that the producers of capital goods allocate their demands for the factors of production so as to maintain the distribution of income consistent with the proportions of consumption and saving as well as meeting the exact equipment demands of the consumption- and other capital-goods industries. If there is a discrepancy between the amounts expended upon capital goods and the amounts saved (invested) by income receivers, there is a maladjustment in the structure of production. If the amounts expended exceed the amounts saved (invested) by income receivers, there is an expansion in the capital-goods industries not warranted by the desires of income receivers, as demonstrated by the failure to save (invest) a larger amount. This expansion in the capital-goods industries leads to overdevelopment relative to the consumer-goods industries, and a *vertical* maladjustment occurs.

A *horizontal* maladjustment occurs, by contrast, when there is an expansion in the capital goods of a particular industry relative to the consumption of the products of that industry. For example, an increase in the demand for television receiving sets would be indicated by a shift in the demand curve to the right. If producers in this industry respond by expanding capacity to a point in excess of the price and quantity locus on this curve, more factors of production have been drawn into this industry than consumer preferences dictated. This results in excess capacity in the industry as well as the production of more television sets than consumers are willing to buy at existing prices. Either prices must fall in an attempt to remove the surplus from the market, or some producers must leave the industry. The latter is equivalent to a reduction in investment in the industry. A horizontal maladjustment is not necessarily associated with cyclical fluctuations in economic activity, but vertical maladjustments are pointed out as the cause of such fluctuations. At any given moment, one will probably find any industry in a state of insufficient or excess capacity, i.e., a horizontal maladjustment; but this in itself does not mean that there is a period of prosperity or depression. The difference between a horizontal and a vertical maladjustment is not always easy to determine. The line between the two is rather thin and fluid. Frequently, one may accompany the other. It is when horizontal maladjustments become widespread, that they tend to surrender their individual identity and emerge as a vertical maladjustment. When this occurs, there is a change in the general level of business activity of such magnitude as to identify itself as a phase of the business cycle.

This concept of vertical and horizontal maladjustments is of considerable use to the businessman. It is quite important to distinguish between general movements in economic activity and fluctuations in a particular industry. The determination of business policy ordinarily will be different in the two cases. If the businessman is able to distinguish between the two maladjustments, he is in a better position to take such steps as will help him to avoid losses or to take advantage of the opportunity for larger gains. If the rise or decline in activity is primarily confined to his industry, the businessman may then inquire as to the cause for such movement and adjust the affairs of his firm accordingly, if he is able to do so.

The theory is rather complex because of the assumptions upon which it is based. The chief assumption is that the *structure* of production becomes distorted as a period of prosperity develops. It is the development of this distortion, together with the existence of a fractional reserve banking system, which must inevitably collapse, since such a distorted structure cannot permanently be maintained. The concept of distortion is best illustrated by assuming an economic society operating at equilibrium, that is, saving and investment (both real and monetary) are in balance, as is the allocation of factors of production between the capital- and consumption-goods industries. If, in such a society, all factors are employed, an increase in the output of capital goods can come only at the expense of a reduction in the output of consumption goods and vice versa. With a given and fixed money supply (i.e., no credit-creating banking system) and price level, businessmen would be unable to increase their investment unless consumers spent less on consumption goods and saved more, which they were willing to lend to businessmen. If consumers did this, it would permit a reduction in the factors used in the consumption-goods industries and their transfer to the capital-goods industries without bidding up their prices to accomplish the transfer. It is assumed that labor is mobile and that it would shift to the capital-goods industries at existing rates of pay rather than remain unemployed. This modification of spending and saving habits will permit the structure of production to change, so that the society's capital equipment will be increased in order that the output of consumption goods will be increased at some future time.

When the capital goods are completed, they will be used to produce additional consumption goods, which will be purchased. At this point, however, it must be emphasized that these additional consumption goods can be removed from the market only if (1) prices fall so that the money value of the total volume of consumption goods is equal to that portion of the fixed money supply which consumers elect to spend instead of save or (2) on completion of the new capital goods consumers modify their spending and saving habits so that they save only that portion of their incomes which will permit them to remove the new volume of consumption goods from the market at their original prices. This latter situation would mean that the rate of capital accumulation of the society would proceed at a lower rate than existed before consumers originally decided to save more. If the removal of the additional consumption goods from the market is accomplished by the modification of saving and spending habits, it would be necessary for consumers to have perfect knowledge of the completion of projects in the capital-goods industries and to change their habits accordingly. Otherwise, the transition in spending habits would cause frictions and bring about the very conditions which the modification is intended to avoid.

The proponents of this theory are not clear in their definitions of *distortions* in the structure of production. It is referred to as an increase in the number of "stages" in the productive process from raw material to finished consumption goods. Translated into terms of business organization, it is not clear whether it is meant an increase in the *number of firms* in the various stages of processing between raw material and finished goods or an increase in *specialization* in the productive process itself. An increased volume of production in the capital-goods industries makes it possible to make wider use of large-scale production. But this may occur either by means of an increase in the number of firms or within the existing corporate structure. It could also be carried out by a reduction in the number of firms as a result of integration and an increase in size of existing firms. What is probably meant is a general increase in total investment in the capital-goods industries relative to the amount of consumption goods which will be taken off the market at given prices and income distribution. This is not to discount entirely the possibilities of overexpansion as applied to specialization. If the emphasis is directed at increased specialization, it raises the question as to whether businessmen expand only because of new methods of production which permit of increased productivity or whether they expand because of anticipated increase in demand for goods produced by present methods. If the theory is to be consistent, the motive must be the former, because with a fixed money supply the only way in which an increased supply of consumption goods could be removed from the market is through lower prices. The prospect of constantly falling prices in the future for an increased output of consumption goods holds little hope for higher profits if the goods are to be produced under existing efficiency standards.

While these complexities may appear to be of academic character, they are, nevertheless, of importance to the businessman. Not only must he consider, in forecasting the future, the problem of whether or not the capital-goods industries are building capacity in excess of foreseeable needs, but he must also consider the wisdom of the nature of his own proposed expansion. That is, will his expansion take the form of merely increased capacity under his present productive organization, or will it take the form of increased productivity through larger-scale methods? In the latter case he must consider the amplitude of fluctuation of his demand, since a higher level of demand may support such large-scale operations only if it is expected to be maintained sufficiently long to amortize his capital costs. If such demand is of a temporary nature or he is not able to expand his market over a wider area, it may be more economical in the long run to expand output by more intense operation of his present productive setup.

As has been implied, economic fluctuations occur under this theory because of the power of the banking system to create credit. If we assume the state of equilibrium and full employment described above, the distortion in the structure of production may be traced. With a credit-creating banking system, when businessmen wish to expand they are not compelled to depend solely upon the spendings-savings decisions of income receivers. In the absence of investment funds from savers at satisfactory rates, businessmen borrow from banks to finance their expansion. These funds enter the market and compete with the existing money supply for the factors of production. Since no factors have been released from the consumption-goods industries because of less spending on the part of consumers, it means that businessmen must attract factors from the consumption-goods industries through higher prices for their services. As factors leave the consumption-goods industries for higher prices in the capital-goods industries, the former are forced to pay higher prices in an effort to retain them. This results in higher prices for consumption goods. These higher prices are met in whole or in part because of increase in consumers' incomes as a result of the new money spent by the capital-goods industries. But the businessmen in the capital-goods industries, in order to obtain the necessary factors to carry out their plans, must pay even higher prices. To finance these higher costs, they borrow more money from the banks, which, in turn, are paid to consumers as owners of factors. The price spiral continues upward, but, because of their ability to obtain new money from the banks, the capital-goods industries are able to outbid the consumer-goods industries for factors.

So long as the expansion continues and new funds are supplied by the banking system through loans to businessmen in the capital-goods industries, factors will be drawn away from consumption-goods industries as prices rise. But this type of expansion is laying the groundwork for its own collapse, which comes when the banking system must limit its lending activities because of lack of reserves. This means that many ventures in the capital-goods industries in the process of construction will not be completed. Factors employed in these industries will be unemployed and will not be immediately absorbed in other capital-goods or consumption-goods industries. With a decreasing money supply, there is a long and painful period of readjustment as income receivers attempt to adjust the ratios of spending to savings. More factors were employed in the capital-goods industries than the savings of the income receivers warranted, and, when there are no further funds forthcoming, the structure of production will attempt to adjust itself to conform with the spending-savings desires of income receivers.

The length of the period of depression and adjustment will depend upon the extent of the distortion in the expansion process. During the downturn there is a struggle to hoard cash and build up reserves. This tends to accelerate the downward movement and bring on the period of depression. As the banking system strengthens its reserve position and accumulates funds, interest rates fall. The decline in interest rates, together with a disappearance of pessimism which occurs when the readjustment is complete, encourages businessmen to undertake new investment. If the banks create new credit then, the upturn begins, and another period of prosperity follows, which must inevitably collapse.

According to this theory, the business cycles could be eliminated by control of the money supply. Control would not, however, be through discount rates and open-market operations, as in the case of the pure monetary theory discussed earlier, but by maintaining a constant supply of money. This theory is incomplete and defective in many respects, but these criticisms cannot be discussed here. While it accounts for a movement from one period of prosperity to another, it is based upon some rather questionable assumptions in the light of twentieth-century experience. It is included here for whatever contribution it may make to any synthesis of business cycles that the businessman may undertake in his attempts to determine future policy for his firm.

Nonmonetary Overinvestment Theory

This theory, while similar in some respects to the monetary overinvestment theory, emphasizes the wide fluctuations in the capital- and durable consumer-goods industries as contrasted to fluctuations in the perishable consumer-goods industries. As shown in Exhibit 4, the fluctuations in the former are much greater than in the latter, and this phenomenon is the foundation upon which the present theory is built. While money plays a part in this theory, it is assigned a passive rather than a motivating role. It does not conclude that monetary management could control the business cycle but, on the contrary, argues that monetary controls would avail little, since the difficulty is deep-seated in the nature of the durable-goods industries. Bank credit, while a necessary means of financing an expansion of the durable-goods industries, would not maintain a high level of operations in these industries if indefinitely extended.

Once a revival has set in, the upswing is similar to that of the monetary overinvestment theory. Revival and expansion first occur in the capital- and durable-goods industries. This results from decisions on the part of businessmen in these industries rather than as a response to an increase in consumption. Businessmen are motivated by the relationship of the interest rate to the expected profit rate. A lowering of interest rates relative to the expected profit rate or an increase in the expected profit rate relative to the interest rate is sufficient to cause an increase in investment. In the case of the former a reduction of the interest rate by the monetary authorities would initiate a revival, while the latter appears to be a psychological phenomenon. This lead in increased activity in the capital- and durable-goods industries causes an increase in consumer incomes and purchasing power. Demand for capital goods increases first, and this later stimulates increased demand for consumption goods. This results in an increase in profits, increase in optimism, increase in orders for more capital goods; prices begin to rise, and factors become more fully employed, and the upswing is under way.

The period of prosperity which develops from the upswing cannot be maintained because of a shortage of capital. This shortage of capital, however, is not a shortage of money capital but a shortage of real goods and services used to produce capital. All goods and services are divided into the following four categories: "(1) goods for current consumption (food, clothing, etc.); (2) durable and semi-durable consumption goods such as residential buildings, water supply, electric light installations, gas plants and other public utilities [furniture and motor-cars occupy an intermediate position between (1) and (2)]; (3) durable capital goods (fixed capital) such as mines, ironworks, brick and cement factories, textile plants, machine factories, railroads, power plants, etc.; and (4) materials required for the construction of durable goods (goods for indirect or reproductive consumption), such as iron, steel, cement, lumber and bricks."[13] These categories of goods are combined in certain proportions for the purpose of producing any one or more of the four. That is to say, they are complementary, in that the production of a given amount of the first category requires a certain combination of categories 1, 2, 3, and 4. The boom comes to an end because of a

[13] Haberler, *op. cit.*, pp 75–76

disproportion in the rate of production of these several categories of goods. If, for example, there is a relative lag in the output of the second category (i.e., a shortage in supply), there automatically arises a *relative* overproduction in the remaining three categories. This means that there must be a slowdown in the output of those goods in excess supply because of a decline in demand for the goods and services in those categories. This decline in demand appears as a failure to spend money on these available goods. That is, the funds which are generally obtained from savings and bank credit are not forthcoming. The reason they are not forthcoming is not so much that they do not exist as that there is no reason to borrow and invest because one of the categories of goods essential to further economic activity is not available. Therefore, why should the businessman continue to purchase goods for which he has no immediate or foreseeable future use? The shortage of capital which appears as a shortage of capital funds (money) is really not that at all, but a shortage of certain goods to continue the productive process.

The contraction in the categories of goods in excess supply causes a reduction in expenditures by businessmen, which results in a reduction of income for workers and suppliers of materials. This is the beginning of the downturn. Rising prices during the later stages of the boom tend to reduce savings, which is further accentuated by the decline in incomes. A decline in incomes is accompanied by a reduction in total expenditures for goods, and the contraction is further reinforced, which causes a further decline in incomes and so the downward spiral becomes cumulative. As the downswing gains momentum, an attitude of pessimism develops among businessmen, and they tend to contract their scale of operations in an effort to protect their positions in a declining market.

At this point the monetary theorists would suggest that the boom could be extended or maintained by the creation of additional funds. The proponents of the present theory, however, argue that additional money would not alleviate the situation, since the goods which are in short supply are simply not available to be used in a complementary manner with those in adequate supply. Since it is a shortage of goods and not of money, the creation of new money would only tend to increase cash balances in the hand of businessmen and consumers. The shortage is not one of money, since hoards tend to increase during the downswing. It is a refusal to spend the money on goods which are available, since they are of little use without goods in the remaining categories outlined above.

Revival occurs, under this theory, not from an increase in demand for consumer goods but because of new investment undertaken by businessmen. New investment may be undertaken because goods in all categories are now available. During the period of depression the shortages of certain goods has been overcome, so that revival is possible if other conditions are favorable. Because of the accumulation of money hoards and excess bank reserves during the depression, prices and interest rates have fallen. Particularly does the fall in interest rates affect investment activity, since it is held that investment in capital-goods industries is very sensitive to changes in the interest rate. As interest rates fall relative to the expected profit rates on given investments, businessmen borrow in order to increase their output. This results in additional payments to the factors of production and increases purchasing power. The period of pessimism develops into one of optimism, and the upturn is thus initiated. The theory also places considerable importance upon exogenous causes in stimulating the upturn. War, innovation, and technological advances are given a central role. One also notes that the psychological theories are also drawn upon to explain the upturn.

This theory, as one complete in itself, is not so well developed as are some of the others. Its greatest contribution is the explanation of the breakdown of the boom period. It draws heavily on the psychological and innovation theories for an explanation of the upturn. From the viewpoint of the businessman this theory might be viewed as a "bottleneck" theory. In times of prosperity the businessman is frequently faced with bottlenecks in supply of factors necessary to his operations. Although he may have long-established contacts with suppliers of his raw materials, he is faced, in periods of rising prices, with the possibility of losing these sources unless he can meet the rising prices or, in some cases, be willing to offer more than the quoted prices in order to insure himself of adequate quantities. He faces the same problem with his labor. While he may be paying wages equal to, or possibly higher than, the going rate, if his particular labor is of a highly skilled type he may be forced to pay even higher wages offered by other businessmen in order to keep his labor force intact. Briefly, whenever a factor is in short supply compared to others, there is a tendency among businessmen to protect or insure their supply of such factor by bidding up the price. This means that firms who are unsuccessful in the race of rising prices must forego use of the factor. In order to meet the rising prices, a firm must have either ample cash resources of its own or be in a position to obtain the necessary credit. Rising prices tend to restrict savings (retention of earnings) on the part of the firm, and rising prices of consumer goods likewise restrict the savings of individuals who supply capital funds through the purchase of securities. Marginal firms who have inadequate cash or credit facilities must then leave the market unless they are able to substitute other factors for the one in short supply, a process which is usually limited in the short run. (Ordinarily, a substitution of factors involves a change in capital equipment. During a period of prosperity a short-run substitution of factors will probably involve higher rather than lower costs.) If a firm is unable to make a substitution, then it must cease operations until such time as it is able to obtain the factor again. This means that other factors ordinarily employed in conjunction with the factor in short supply are forced into idleness. If such shutdowns become widespread, so that many factors in amply supply become unemployed, there is a reduction in purchasing power, and a downturn sets in. If one or a few businessmen hoard the scarce factor, the downturn may occur because their expenditures are not great enough to keep the national income from declining. Even if businessmen could borrow unlimited funds, the theory concludes that this would only ration the available supply of the factor among the businessmen, and, once this were done, those who did not obtain a supply of the factor could not continue operations.

For the businessman this theory has some importance as concerns inventory policy, labor contracts, and general business conditions. If, in the early part of the upswing, the businessman can foresee a future bottleneck in the supply of some factor, he may build up his inventory to such an extent that he may have a sufficient supply on hand, while others are unable to acquire it currently. In addition to maintaining production, he may also enjoy capital gains from increment in value of inventory. This policy, however, requires some estimate as to the amplitude and duration of the price fluctuations of the factor, but perhaps more important is just how long the boom period will last. The latter is important so that the businessman may not acquire such an excess supply of the factor that he is overstocked when the boom ends. At the same time, he must have enough on hand to insure as great a profit as possible. In other words, while the businessman may not analyze business fluctuations in terms of this theory alone, some of its contributions may enter into his own synthesis of causes of business fluctuations.

Overinvestment Due to Changes in Demand

In sharp contrast to the preceding theory, the cause of overinvestment in the present theory is the result of attempts of businessmen to adjust the output of capital goods to changes in demand for finished goods instead of changes in the interest rate or expected profit rate. This theory attempts to explain the phenomenon of violent fluctuation in the durable-goods industries on the basis of the inherent durability of the goods themselves, technological limitations, and tradition. Because of the roundabout methods of a capitalist economy (i.e., the existence of several stages in the productive process) and the durability of goods, a change in demand for finished goods is magnified several times in the capital-goods stages of the productive process. Finished goods, in this case, means finished capital goods in the sense of being sold from one firm to another as well as finished consumer goods. This relationship between a change in demand for finished goods and the response of suppliers to meet such change is known as the "acceleration principle."[16] As the change in demand is transmitted from finished goods to producer to processor to semiprocessor to supplier of raw materials, etc., the percentage change in demand is "accelerated" at the time of transmission from one stage to another. The change in the level of output to meet the change in demand is progressively larger at each stage of production in most cases.

It has been pointed out that the acceleration principle works in three general cases: (1) changes in demand for *producers' durable goods* in response to a change in demand for finished goods; (2) changes in demand for *durable and semidurable* consumption goods in response to a change in demand for the services provided by these goods, and (3) changes in *commodity stocks* in response to a change in demand for such goods in a given period of time.[17] Discussion of the acceleration principle usually starts with an assumed increase in demand for finished goods, regardless of how this increase comes about. While some theories of the cycle are concerned with why there is an increase or decrease in demand, the acceleration theory is not always so concerned. Proponents of the theory do not always ignore the relationship between investment expenditure and consumer spending, but no attempt is made to establish the initial motivating force which brings about an increase in demand. The theory of acceleration of demand is more concerned with demonstrating the effects of changes in demand upon the level of output in the durable-goods industries than it is with a complete theory of the cycle. To the businessman the theory is important, since it points out relationships which are important for long-run forecasting, particularly in the upswing of the business cycle.

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[16] J. M. Clark, *Strategic Factors in Business Cycles* (New York, National Bureau of Economic Research, 1934), chap. v.

[17] Haberler, *op. cit.*, pp. 88–89.

Demand for capital goods is derived from the demand for the products made by these capital goods. But capital goods are durable, and, once constructed, they contribute to the production of finished goods for various periods of time. A machine which is completed and put into operation today will be producing goods several years hence. In order to meet the level of *existing* demand, machines must be constructed which will supply demand *several years hence*. This characteristic of producers' goods is important to the concept of the acceleration principle. Likewise, the demand for durable consumer goods is not a demand for the goods themselves but a demand for the services they render. Automobiles are demanded for transportation (perhaps in the luxury type of automobile conspicuous consumption may be a factor), apartment houses are demanded for shelter, furniture for physical comforts, etc. Durable consumer goods purchased in any one year have a useful life of several years and hence yield their services over varying periods of time. Since both capital and durable consumer goods yield services over a protracted period of time, their purchase can be postponed and their services extended over a period longer than ordinarily anticipated. Those who demand services of durable goods may be willing to extend these services, even though they may be of lower quality because of increasing age of such goods. Or, because of the cost of replacement, repairs may be made to existing durable goods and their service lives extended over a period greater than originally anticipated. Such extensions of service cause the purchase of new durable goods to be more erratic and thus show greater amplitude of fluctuation than is the flow of the services which the goods themselves yield. If many persons decide to postpone the replacement and the purchase of new additional durable goods because of a pessimistic view of the future, these postponements tend to become "bunched," and the output of durable goods declines sharply. When the outlook is more optimistic and existing durable goods are old and worn, decisions on the part of many people to replace them or to add to their total quantity of such goods leads to a similar "bunching" of orders for new durables. The result is a series of sharp alternations of falling and rising activity in the durable-goods industries, with attendant fluctuations in employment and hence in consumer income.

The principle may be simply illustrated as follows: Assume that the current demand for men's shirts is 1,000 units per year and that this demand is met by 10 machines whose annual output is 100 units per year. Also assume that the average life of each machine is 10 years and that the number of machines currently being used was gradually reached at the rate of 1 additional machine each year, so that the number of machines replaced each year is 1. So long as there is no change in demand, there is stability of output in the industry supplying machines for the production of shirts. Suppose, however, that the demand for shirts increases by 10 per cent in the coming year, that is, rises from 1,000 units to 1,100 units per year. In order to meet this increased demand, the manufacturers of shirts must order 1 additional machine Since the current output of the industry supplying shirt-producing machines is 1 per year, there must be an increase to 2 for the coming year if the new level of demand is to be met. But this is an increase of 100 per cent in the output of the shirt machinery industry! This means a sharp increase in the demand for raw materials from which shirt-producing machinery is made, as well as an increase in employment of considerable proportions in that industry. The increase in employment results in an increase in consumers' incomes and subsequent increase in demand for finished goods, which is again transmitted to the capital-goods industries in the form of accelerated demand for producers' durable goods.

Suppose that, as a result of an increase in employment in the industry supplying shirt-producing machinery, there is a further increase in the demand for shirts from 1,100 to 1,400 units per year. Then, in the second year, the suppliers of shirt-producing machinery must produce 1.1 new machines for replacement and 3 new machines to meet the increased demand, or a total of 4.1 machines, compared to a total output of 2 machines the first year. But it should be noted in the latter case that an increase in demand for shirts of slightly more than 27 per cent was required in order to cause an increase in demand for machines of approximately 100 per cent. If the new level of output is to be maintained in the industry supplying shirt-producing machines, demand for shirts must continue to increase at an increasing rate. This may be illustrated by assuming that in the second year the increase in demand for shirts, instead of 1,100 to 1,400 units, was from 1,100 to 1,200 units. The situation in the shirt machinery industry would have been modified as follows: There would have been a normal replacement demand of 1.1 machines, plus 1 additional new machine to meet the increased demand, a total of 2.1 machines. In this case the increase in demand for shirts amounted to approximately 9 per cent, while the increase in demand for shirt-producing machines amounted to approximately 5 per cent. It is important to point out that, in this case, although demand for shirts increased, the demand for machines increased by a smaller proportion. *Absolute* demand in both cases increased, but the *relative* change was different.

The violence of fluctuation in the shirt machinery industry can be emphasized perhaps more in the following manner: Assume that the demand which has risen from 1,000 to 1,100 units in the first year, remained at the latter level in the second year—that is, the new level was maintained but there was no further increase. The industry supplying shirt-producing machines which had increased output 100 per cent the first year, i.e., from 1 to 2 machines per year, must undergo a contraction of activity in the present case. After having produced the extra machine the year before, it is necessary to produce only normal replacement needs, which in the present case amounts to 1 machine for replacement of the original 10, plus 0.1 machine per year to maintain replacement on the additional machine constructed last year. Output of the machinery industry has *decreased* in this case by approximately 50 per cent. In order even to *maintain* output and employment in the capital-goods industries, there must be an *increasing* rate of increased demand for shirts. The maintenance of the level of demand for shirts in the second year means the contraction of output and the discharge of workers, as well as reduction in volume of orders for raw materials in the machinery industry.

The foregoing discussion of the effects of a change in demand for finished goods is subject to some rather strict assumptions. In practice, one would hardly expect to find replacement of durable goods occurring in such an orderly manner. In almost all cases it is "bunched," so that the fluctuations described above would be more violent than the above results indicate. As a period of prosperity sets in and demand for finished goods increases, there is a "rush" on the part of businessmen in the consumer-goods industries to place increased orders so that demand is increased somewhat suddenly. To meet the demand for additional machinery to make these goods, the capital-goods industries expand by several hundred or thousand per cent. Then when the demand levels off at the new peak (aside from a possible decrease), there must be a contraction in the capital-goods industries to a replacement basis. Another modification of the results above is that the greater the durability of a machine, the greater the rate of expansion faced by the capital-goods industries by a given increase in demand for finished goods. Likewise, the shorter the life of the durable goods, the less violent the transmission of increased demand through the productive stages. The acceleration principle also occurs in stages other than that between the producers of consumers' goods and the industry producing the finished machines. In the case of the demand for shirts discussed above, when the machinery industry received orders for additional machines, it placed orders with the makers of machine tools; this industry, in turn, placed orders for still other tools and raw materials, each in its turn causing a far greater effect upon output of a particular industry than the increase in demand for the finished consumers' goods.

As suggested earlier, the demand for durable consumers' goods is a reflection of the demand for their services. When there is an increase in the demand for auto transportation, the increase in demand for automobiles is magnified by a larger percentage than that of the service of transportation. The same is true of housing. An increase in the demand for apartments increases the demand for apartment buildings but by a larger percentage than the demand for shelter. Both automobiles and houses are subject to replacement at intervals as they wear out, so that the automobile and housing industry are normally operating at replacement level. But if there is an *increase* in the demand for the services of these products, the increase in demand above the normal replacement level is accelerated in the same manner as described for the capital-goods industries above.

The principle of the relationship between demand for finished goods and the demand for machinery with which to produce them is also applicable to changes in demand and changes in inventory. This relationship is based on the assumption that the businessman attempts always to maintain a certain ratio between inventory and sales. If sales are made at a steady pace, then orders to suppliers for replacement of depleted stocks is on an orderly basis. However, should the businessman experience an increase in sales which he anticipates is more than a temporary phenomenon, he increases the amount of inventory he carries on hand. This means that the demand for goods from the producer is increased not only to replace the goods which are sold but also to build stocks to higher levels. During the period of increase in stocks, the demands placed upon the producer are greater, percentagewise, than the increase in demand facing the businessman selling the finished goods. When the stocks have been increased to the desired level, then the demand facing the producer drops to replacement level in the same manner as outlined above in the case of durable capital goods. In order to maintain the level of output demanded of the producer occasioned by the increase in level of inventories, it is necessary that the demand for the finished goods continue to increase at an increasing rate.

The acceleration principle of derived demand is not valid under all conditions. The relationship between demand for finished goods and derived demand for productive machinery assumes a fixed relationship between the amount of capital required for a given output. Such a relationship is not a fixed one in either the long or the short run. If there are idle resources available in the equipment-producing industries, the principle of acceleration will not become effective until all excess capacity has been taken up. Only then will it be necessary to increase the amount of capital equipment to supply the increased demand. In the short run the necessity for constructing new capital equipment may be avoided by an increase in working shifts per day or by use of overtime. In the long run the construction of new machinery permits of the introduction of improvements in productivity of machines, and this may modify the relationship between the demand for goods and the demand for machinery with which to supply them.

From the viewpoint of the businessman it is important that he estimate the nature of his demand, i.e., changes in demand, before he embarks upon a program to install additional equipment to meet the demand. If the demand is of a temporary nature, he may find it more economical to use overtime and utilize his existing capital equipment more intensively. On the other hand, if the increase in demand is of a permanent nature, i.e., expected to last for some considerable period, then the businessman should weigh the alternatives of utilization of his present capital equipment more intensely against the installation of additional equipment or possibly a complete modernization of parts or all of his plant. The businessman engaged in the production of producers' goods should be well acquainted with the acceleration principle and understand its possible application as an explanation of the violent fluctuations in demand for his products.

The acceleration principle is more a tool of analysis to explain the cumulative expansion which occurs in a period of revival and prosperity than a complete theory of the business cycle. The end of the boom may come because of a shortage of capital, as explained in the theory discussed in the preceding section, or it may come about because of a flooding of the consumer-goods market.

Recent Developments in Business-Cycle Theory

Since early in the decade of the 1920's and up to the present, attention has been focused upon the role of the inequality of saving and investment as the motivating factor in economic fluctuations. The core of the thesis is that an excess of investment over saving causes an increase in the level of economic activity, while an excess of saving over investment brings about a decline. So widely held is this thesis by many students of economic fluctuations that they have devoted a major share of their writings to factors which bring about an inequality of saving and investment. This line of thought has been developed more in monetary than in nonmonetary terms. Less attention is given to the structure of production and more emphasis placed upon the flow of money in the economy.

The problem of saving and investment is attacked in terms of income, employment, output, consumption, saving, investment, money supply, and the interest rate. The total national output is equal, in money value, to the total money income for a given period; that is to say, the production of goods and services involves expenditures to the factors of production, including intrepreneurship. These expenditures are the incomes of the various factors, their compensation for services and materials rendered. These payments equal the value of the total output; hence money value of output equals total money income, by definition. Income received by factors or individuals who own factors is either spent or saved. A portion is ordinarily spent on consumption and the balance is saved. Total money income, then, is equal to the amount spent on consumption plus the amount put aside as saving. This may be expressed symbolically by letting Y represent income, C represent consumption, and S represent saving. We have the equation $Y = C + S$. From the standpoint of output—that is, the real physical goods and services—the amount of total output which is not consumed is saved and becomes a stock for future use—it is an investment which will yield income or be consumed in the future. This investment takes the form both of additions to capital equipment and of stocks of goods which are not consumed in the given period. Let O represent output, C the goods and services consumed, and I the goods and services not consumed but considered investment. We have $O = C + I$. But $Y = O$ by definition. Therefore, we have:

$$Y = C + S, \qquad O = C + I, \qquad Y = O,$$

$$Y = C + I, \qquad \text{therefore, } S = I.$$

The condition represented by the last equation exists only in an equilibrium state. Equilibrium occurs when all saving out of income has been invested, so that the level of money income and output are constant from one period to another. There is an implicit assumption in this condition; that is, prices are stable or any changes in price are offset by changes in the opposite direction. If this were not the case, then a general lowering of *all* prices, for example, would allow some persons to build up cash balances which would permit an upsetting of the equilibrium state in the next or succeeding periods.

By assuming an equilibrium condition to exist, the theories explain the business cycle in terms of differences between S and I. The difference arises because of failure of saving by income receivers to move the funds immediately into investment. Some terminological difficulties arise, since the above equation shows saving and investment to be equal at all times. This is because the equations portray a static condition, that is, at any given point in time, saving and investment are always equal. This situation is explained as follows: Even though income receivers may withhold some of their income in the form of saving, they do not necessarily invest it by purchases of securities or other means. This means that all the output which was produced during the period will not be purchased in the market. Some capital goods will remain unsold, and the various industries will accumulate inventory. But this accumulation of goods in the hand of producers is considered investment, since, by definition, that part of the physical output which is not consumed is invested. In the hands of income receivers will be the funds which they did not spend for these goods or lend to businessmen to purchase capital goods. Therefore, the saving of the income receivers is equal to the investment of the businessmen in the form of unsold goods and services, so that, for the economy as a whole, saving equals investment and the equilibrium condition is met. This analysis avails us little to explain differences between saving and investment.

The difficulties of this analysis were overcome by a group of Swedish economists who view savings and investment as *ex ante* and *ex post*. The situation in a state of equilibrium as outlined above is considered *ex post*. *Ex post*, saving and investment are always equal. But *ex ante* saving and investment are not necessarily equal. *Ex ante* saving and investment may be thought of as "planned" saving and "planned" investment. Now, since those who plan investment and those who plan saving are not identical persons, a difference between planned saving and planned investment may arise. Businessmen who plan investment may make investment plans which exceed or fall short of planned saving on the part of income receivers. If businessmen plan investment in excess of planned savings, income payments rise and the economy is inflated so that economic activity rises and a period of prosperity ensues. If, on the other hand, businessmen plan investment which falls short of planned savings, income falls and there is a decline in economic activity. The latter condition is perhaps more quickly appreciated than is the former. In the latter there is an increase in cash balances of income receivers, since all their saving was not channeled into investment and was therefore hoarded. All the goods produced were not sold, and *ex post* we have saving and investment equal in the manner described above. In the former statement, where planned investment exceeds planned saving so that economic activity rises, some assumptions are necessary. Either it must be assumed that the investment in excess of planned savings was financed by bank credit and that additional goods were placed on the market during the period which could be purchased by this bank credit or that planned saving is considered as a percentage of income saved, so that a higher income resulting from greater investment expenditure raised income sufficiently for the absolute amount saved by the economy as a whole to be sufficient to finance the increased expansion. This is a gap or a rough spot, at least, in this theory.

This theory, like the overinvestment theories, emphasizes the fluctuations in investment and their subsequent effects upon income. Investment is the active factor which influences the direction and level of economic activity. So long as investment plans are kept equal to saving plans, there can be no decline in income and employment. The motive underlying investment plans is the difference between the market rate of interest and the expected profit rate on planned investment.

Without entering upon a long and complex discussion concerning the theory of interest, it is assumed here for the purpose of explaining cyclical movements that the demand for capital funds (willingness of businessmen to borrow) and the supply of such funds (saving supplemented by bank credit) determine the rate of interest. If the market rate of interest is below the expected return on investment, businessmen borrow to expand investment. This results, if the demand for investment funds is greater than the supply of saving, in an expansion of investment activity, so that income is increased over the level of the period preceding. Apparently, the extension of bank credit prevents the rate of interest from rising sharply so that planned investment in excess of planned saving can be carried out. Otherwise, the deficiency of saving would cause the interest rate to rise and cancel some investment plans of a marginal character. Increased investment increases money income, which increases the supply of saving, and the upswing continues. The excess of planned investment over planned saving cannot continue. As the *ex ante* period materializes into the *ex post* period, businessmen discover that their plans were in error as to cost of capital funds (the interest rate rises as it becomes apparent that the demand for funds is greater than the supply), realized profits failed to equal expected profit rates, planned volume of sales does not equal realized sales, etc. They then engage in efforts to correct their errors and contract or cancel their investment plans in an effort to adjust themselves to their realized positions. This results in a decline in incomes in the following period, and a downturn sets in. The downturn continues until either planned investment and planned saving are equal *ex post* or until planned investment exceeds planned saving *ex post*, the former being a state of equilibrium and the latter bringing about a revival of the level of economic activity.

Upon the saving and investment explanation of economic fluctuations have been built the most widely held underconsumption theories of business cycles. Many students have written upon the underconsumption theory of the cycle, but the most famous exponent of this theory is the late John Maynard Keynes, assisted by a large number of disciples of his theory. No attempt will be made here to discuss all the refinements added by his followers but only to set forth the fundamental thoughts of Mr. Keynes, which have had such a great impact upon economic thinking as concerns both the cycle and general economic theory.

In both his *Treatise on Money* and his later work, *The General Theory of Employment, Interest, and Money*, Mr. Keynes emphasizes the fluctuations of investment activity as the determinant of the level of economic activity. Since his earlier work was considerably modified by the later one, attention will be focused upon the second work. In the *General Theory* the author's efforts were directed toward establishing a framework of general economic theory, but in the process he provided us with some excellent analytical tools to explain cyclical movements. The theory is one not only of underconsumption but also of underinvestment, in contrast to older underconsumption theories which considered underconsumption as overinvestment. His greatest contribution in the field of cycle theory is that saving and investment can be equal at less than full employment of the factors of production. This offers a possible explanation as to why depressions may last for considerable periods and also why a period of prosperity may not end in a period of full employment but level off or suffer a downturn before such a condition is reached.

In addition to a given supply of money, three theoretical concepts are employed in cyclical analysis, namely, the "liquidity preference," the "propensity to consume," and the "marginal efficiency of capital." Changes in saving and investment are affected by changes in any or all of these concepts. Psychological reasons are fundamental to an understanding of these changes.

The concept of liquidity preference is based on the assumption that people have a desire to hold assets in liquid form (cash) for several reasons. First, there is the so-called "transactions" motive. Cash is held to bridge the gap between the receipt of income and its disbursement for consumption. Depending upon the interval of payment and the period over which expenditures are made for ordinary consumption goods, a certain amount of cash must be held. The amount varies with different persons (and firms) both because of the size of the interval between receipt of income payments and the regularity (or irregularity) with which expenditures are made. The longer the period between intervals of income receipt, the larger the average amount of cash which must be held. The timing of payments during the disbursement period also affects the average size of this cash balance. The holding of cash for this purpose is a necessity. Any funds remaining after providing for the "transactions" motive are held as a precaution against unforeseen expenditures, such as emergencies or "rainy-day" expenditures. The amount of this cash balance will vary according to the individual's appraisal of the probability of such events. After providing for these two motives, the individual has a balance (if his income is sufficiently large) which he saves. He is confronted with a decision as to the form of asset in which this saving is to be held, cash or securities. Cash is the most liquid of all assets, and the individual decides upon the degree of liquidity he wishes to maintain. It is here that the rate of interest affects individuals who provide funds for investment. The individual decides whether the rate of interest will compensate him sufficiently for parting with liquid holdings and accepting securities instead. He evaluates the risks involved in exchanging cash for securities of less liquidity. If the anticipated rate of return, measured by the rate of interest, is worth more to him than the holding of cash which does not earn interest, he purchases securities. If, on the other hand, the anticipated return is insufficient to compensate him for the loss of liquidity, he holds his assets in the form of cash. Interest, then, is a compensation for surrendering liquid assets for less liquid assets.

This is in contrast to the classical theory of the supply of saving for investment, which holds that a rise in the rate of interest encourages individuals to increase their savings and decrease their consumption. Mr. Keynes's position, on the contrary, is that a rise in the rate of interest does not increase the rate of saving but only determines whether or not the individual will surrender highly liquid assets (cash) for less liquid assets (securities). The rate of saving is not determined by the rate of interest, Mr. Keynes assumes, but is determined, first, by the size of the individual's income and, second, by the requirements of his "transactions" and "precautionary" motives for holding cash. As will be pointed out below, saving is *more* in the nature of a habit than a response to a change in the rate of interest. A rise in prices of consumption goods, a change in precautionary probabilities, or both, with a given income, will affect the amount that is available for investment in cash or securities. It is the decision of the individual with respect to the amount of cash he wishes to hold or invest which determines his liquidity preference. This may be thought of in terms of a schedule. With a given amount of cash in excess of the "transactions" and "precautionary" motives, the higher the rate of interest, the less cash the individual is willing to hold, and the lower the rate of interest, the more cash he is willing to hold. Given the rate of interest, the supply of money, and the schedule of liquidity preference, the amount of cash available for investment can be determined.

The propensity to consume refers to the spending and saving habits of individuals. The assumption is made that saving is a deeply ingrained habit in modern economic society, and, where the size of the individual's income permits, he does not spend all his income on consumption but saves a portion of it, i.e., saves in the sense of not spending. Whether he keeps his savings in the form of cash or invests them in securities depends upon his liquidity preference, as explained above. The concept of the propensity to consume may be thought of as applying either to an individual or to society as a whole. Since the *General Theory* is concerned with changes in the level of income in the aggregate, the propensity to consume is discussed in a *marginal* sense, i.e., the marginal propensity to consume. This means that with a change in income some portion of it will be spent, while the balance will be saved. Mr. Keynes argues that with a rise in an individual's income the *increment* in income is not all spent on consumption but part is saved. He will spend part of the increase in income on consumption, but not all of it. This is because of the propensity on the part of individuals to save part of their income. By the same reasoning a decrease in income does not bring about an equal decline in consumption but will, instead, be reflected in part by a decrease in saving. Because of the decrease, the individual will attempt to adjust his consumption to his new lower level of income. The implication here is that consumption is not always adjusted by an amount equal to the change in income. When income is reduced, consumption may be reduced less than the lowering of income, while in the case of an increase in income the rise in consumption tends to be less than the amount of the increase. Consumption is seldom adjusted, as a result of a change in income, so as to require the use of all income if the size of income permits saving. Changes in income, therefore, do not bring about an equal change in expenditure on consumption, but savings bear part of the adjustment. It may be pointed out here that if, for example, an individual experiences an increase in income and does not spend all of it, the part he saves will increase the size of his cash balances if there is no change in the interest rate or in his liquidity preference. This has an important bearing on cyclical fluctuations.

In connection with the marginal propensity to consume, Mr. Keynes developed the concept of the "multiplier." This is a concept which shows the relation between an expenditure or *net* new investment and the level of income. It explains the cumulative increase in income during a period of expansion. Suppose that society as a whole has a marginal propensity to consume of 0.8, i.e., of an increment in income of $1, 80 cents will be spent on consumption and 20 cents will be saved. The multiplier in this case is 5.[18] That is to say, an increment of *net* new investment expenditure of $1 will raise the level of income by $5. This is because the original recipient of the initial expenditure of $1 will save 20 cents of it and spend the remaining 80 cents. The next recipient will spend 64 cents of the 80 cents he received and save 16 cents. The third recipient of the 64 cents will spend 51.2 cents and save 12.8 cents, and so on until infinity. The addition of the gross income of all the recipients

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[18] The mathematical relationship between the marginal propensity to consume may be illustrated as follows

Let k represent the multiplier.

$$\text{Then } \Delta Y = k\Delta I, \quad k = \frac{\Delta Y}{\Delta I}.$$

$$\text{Since } \Delta Y = \Delta C + \Delta I,$$

$$k = \frac{\Delta Y}{\Delta Y - \Delta C} = \frac{1}{1 - \frac{\Delta C}{\Delta Y}}.$$

(Haberler, *op. cit.*, p. 225).

will total $5. The greater the marginal propensity to consume, the higher the multiplier; and the lower the marginal propensity to consume, the lower the multiplied. That is to say, the higher the multiplier, the higher will the level of income be raised by a given *increment* in *net* expenditure on investment. In addition to the propensity to consume, one may equally well speak of the propensity to save, propensity to spend, etc., whichever will suit the point of discussion best. The propensity to consume is affected by many factors, and, while statistical efforts have been made to measure it, the results are by no means conclusive. A change in income distribution may and probably does affect the propensity to consume of society as a whole. Individuals with lower incomes usually spend a larger proportion of their incomes on consumption than do those with higher incomes. That is to say, most of the saving is done by the higher-income groups. As the level of income of society as a whole tends to rise, i.e., as the distribution of income undergoes a change, the propensity to consume may tend to fall. This leads to possibilities which are not within the scope of this discussion. Nevertheless, the idea does have meaning to the businessman, since a change in the distribution of income in his market may mean a modification of his policies as to prices, sales policy, and perhaps quality of product.

The marginal efficiency of capital is defined as the ratio of the expected return on an investment over its useful life to its present cost. Or it may be expressed as the expected future returns on a particular investment discounted by that rate which will yield its present cost. Such a rate measures the efficiency of a given proposed capital investment. It is this rate compared to the existing long-term interest rate which determines whether or not a given capital investment will be undertaken. If the rate as calculated is equal to the present long-term interest rate, the undertaking is marginal. Similar to the concept of liquidity preference, it may be thought of as a schedule of investments which will be undertaken at various rates of interest. The higher the interest rate, the fewer the number of expected profitable investments, the lower the rate, the greater the number of investment opportunities. It is a demand curve for investment funds at various rates of interest. Again, like the curve of liquidity preference (the demand to hold cash at various rates of interest), the curve may shift to the right or to the left, indicating a change in the marginal efficiency of capital at various rates of interest. If, for some reason, the expected rate of return on a given investment should rise while the interest rate remains the same, the marginal efficiency of capital is said to have increased. Similarly, if the expected rate of return on an investment should decline, with no change in interest rates, the marginal efficiency of capital is said to have declined. Given the rate of interest and the schedule of the marginal efficiency of capital, the amount of new investment can be determined.

In order to begin a cyclical movement, assume that there is a reduction in the rate of interest. This makes some investments profitable which were formerly submarginal. Businessmen are inclined to borrow to finance these new investment opportunities. With no change in liquidity preference, a reduction in interest rates means that the desire to hold more assets in the form of cash prevails, so businessmen must turn to the banks for credit. If successful in their quest for funds and the new investment is undertaken, the spending of these new funds raises the level of incomes. With the increase in income there will be an increase in the expenditure for consumption goods, but, according to the marginal propensity to consume, the increase will be less than the increase in income. Perhaps it is best at this point to modify the terminology of the propensity and call it the "propensity to spend." This modification will take care of that portion of the increased income which is spent on new securities as well as that portion spent on consumption. The balance, then, will represent that portion of the increase in income which is spent neither on consumption goods nor on new securities, i.e., it is a hoarding of cash. This will avoid complications of how to explain the transmission of saving to investment on the part of income receivers.

As the level of income and consumption rises, the acceleration principle operates within the limits explained earlier, and the multiplier effects explained above also reinforce the upswing. So long as new investment takes place in excess of the amount of income which is not spent in accord with the propensity to spend, the upswing will continue. The marginal efficiency of capital increases as businessmen become more optimistic. While interest rates may rise, the marginal efficiency of capital increases sufficiently to offset the rise. The rise in interest rates causes holders of cash to keep more securities and less cash, so that the expansion may be financed from savings as well as by bank credit. Difficulty arises from two principal sources. First, with a rising income the propensity to spend tends to fall, i.e., the propensity to save rises, and, second, the marginal efficiency of capital tends to decline because of lack of investment opportunities, so that the increased savings find no outlet in investment, and hence economic activity must decline. With the decline in investment activity there will be a fall in income and an accompanying decline in saving. Income will continue to decline, i.e., the downturn will continue, until such time as savings out of current income are equal to current investment. This is a state of equilibrium, and, as Mr. Keynes points out, it is not synonomous with a state of full employment but may exist at levels considerably below full employment.

The period of depression may last for an extended time, so long as equilibrium at less than full employment is not disturbed. Such conventional efforts as lowering the interest rate may avail little, since the marginal efficiency of capital may be so low that an interest rate below the marginal efficiency of capital will cause individuals to prefer to hold cash to securities. During the downturn there is a tendency toward increased liquidity, with a possible shifting of the schedule to the right. Mr. Keynes and his followers conclude that there is a certain minimum rate of interest below which there is an infinite desire to hold cash. If the marginal efficiency of capital is below this rate, little can be expected by lowering the interest rate still further. There is also the difficulty, in this case, that the addition of new funds by government spending will result primarily in an increase of idle cash balances rather than increased economic activity. The propensity to spend has declined while the propensity to hoard has risen. Recovery can come about only through increased investment activity. If such investment is not forthcoming on the part of businessmen, Mr. Keynes proposes that public investment be undertaken in order to raise the level of income. The theory as developed by Mr. Keynes points toward a stagnant economy. Investment opportunities are limited, and, unless they are replaced by public investment, there will always be a tendency for the economy to operate at less than full employment.

Summary

The foregoing sketches of business-cycle theory indicate much conflict of thought as to why business fluctuations occur. Some of the theories have attempted to explain the entire cycle, while others have been only partial explanations of the cycle or some particular phase of it. All the theories are based on certain assumptions and therefore can logically reach only the conclusions set forth. They also postulate the existence of certain causes and effects, and, as a result, they do not all reach the same explanation of the cycle. It is the assumptions and postulates which are of interest and importance to the businessman. While it may be desirable to control the business cycle, the existence of opposing diagnoses of its causes tend to preclude an early and successful remedy. Therefore, the businessman must decide for himself which of the theories or their parts he accepts and on that basis make decisions as to his policy.

One of the more important points the businessman should observe is that the cause-and-effect relationships are not always in the same sequence or of the same degree of importance in all phases of the cycle. During an upswing, investment is given the central role in many theories while consumption is neglected; but, when investment programs are completed, attention shifts to consumption of the goods which these industries now have the capacity to produce. For the businessman this can be translated into a problem of production in the upswing, which later is converted into a problem of marketing and distribution as the period of prosperity begins to wane. Unless the businessman has some knowledge of the theories of business fluctuations, he will find it difficult to recognize more than the superficial transitions from one phase of the cycle to another. Almost all the theories discussed have some contribution to make, and from them the businessman should be able to synthesize a fairly workable theory of the cycle, but, at the same time, bear in mind that it may be in error and subject to correction with the passage of time.

An example of the application of theory may be made in the case of horizontal maladjustments. The businessman who is familiar with this theory will be on the alert to observe the rate of expansion of capacity at his particular stage of his industry. By comparison of capacity to expected demand for goods of that stage, he is able to formulate his own plans for expansion. Other factors besides mere development of capacity of competitors influence his decision. He must gauge his own competitive position in the industry, evaluate his own firm in relation to others on the basis of sales policy, research policy, distribution channels, etc. The more familiar he is with the developments of his and other industries through the

various phases of business fluctuations, the better will be his ability to make logical assumptions and reach more sound conclusions.

SUGGESTED READINGS

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Case VI-1: A & B APPLIANCE SALES COMPANY

The A & B Appliance Sales Company was formed as a partnership by two brothers, Howard and Francis Welch, in 1937. It began operations as a radio repair shop and carried several lines of nationally advertised brands. A very small stock was carried, since distributors for most of the lines were located near by and any model not carried in stock by the company could be secured from the inventory of the distributor in a few hours. In 1938 the firm expanded into the general field of small electrical household appliances, such as toasters, coffee makers, waffle irons, hand irons, etc. The repair service was also expanded to cover these new items. Early in 1939 the firm began the installation of automobile radios for a local automobile dealer. Later the same year, the firm acquired an exclusive contract to sell, install, and service the Motorola auto radio. As a result, it installed auto radios for several dealers in its locality.

Late in 1942, Howard Welch was recruited into the armed services. During his absence the firm continued to operate under the supervision of Francis, who specialized in repair work, since the manufacture of practically all electrical appliances had been discontinued for the duration of the war. During this period Francis sought to obtain franchises to handle certain lines when such products were again available. By June, 1944, he had obtained franchises for Servel refrigerators and water heaters, Westinghouse refrigerators, washing machines and dryers, electric ranges, radio and television sets. In addition, he arranged to stock, on a nonexclusive basis, a large selection of Hotpoint products, such as dishwashers, electric ranges, and small appliances. With the return of Howard Welch from military service in October, 1944, the firm undertook, under agreement with a local plumber and electrician, the establishment of a kitchen planning and installation service. From one of the manufacturers of kitchen equipment the firm was able to obtain free counsel as to kitchen planning.

The building in which the business was housed was owned by the Welch brothers. It was located several blocks from the center of the city but on one of the main thoroughfares. In the rear of the building was the repair shop, which was large enough to accommodate six automobiles as well as the necessary benches and cabinets. Across the alley from the rear of the building was another building which had once been used as a garage by a local delivery service but was vacated when the delivery firm moved to larger quarters. This space was rented by the Welch brothers for warehouse purposes in January, 1945, in anticipation of larger operations. At this time the firm had in its employ one mechanic-electrician, a clerk who served in the store, and a part-time janitor, in addition to the services of the Welch brothers, who worked on sales and installations, together with the plumber and electrician under contract. Prior to the war, sales were made through personal contacts by the Welch brothers and an advertisement was run continuously in the weekly paper, which was published locally. The city in which the firm was located was a large suburb of a metropolitan area, but no advertisements were placed in any of the large daily papers serving the area. The brothers had grown up in the suburb and enjoyed a wide acquaintance.

In order to finance the postwar expansion, the brothers sold an apartment building in which they had an equity of $35,000. They retained three other small apartment houses which they jointly owned. For many years they had enjoyed good banking relations with a local bank, which agreed to extend the firm a line of credit in the amount of $25,000, exclusive of contingent liability arising from indorsement of installment paper which the firm might discount at the bank. At the suggestion of the bank, the firm was incorporated in February, 1945, with each brother holding 50 per cent of the stock. The original firm name was retained. The large increase in capital was deemed desirable so that the firm could purchase several items in carload lots. This resulted in a substantial discount per item, in contrast to purchasing in small lots through a distributor or wholesaler. From his contacts made in 1943 and 1944,

Exhibit 1

A & B APPLIANCE SALES COMPANY, INC.

CONDENSED BALANCE SHEET AS OF DECEMBER 31, FOR THE YEARS 1945-48, INCLUSIVE

	1945	*1946*	*1947*	*1948*
Assets:				
Cash	$ 4,221.91	$ 6,121.95	$ 5,382.36	$ 3,191.57
Accounts receivable	2,927.33	3,025.71	4,271.14	5,815.78
Merchandise inventory	77,933.26	81,721.25	88,164.51	94,117.05
Parts inventory	8,525.95	8,737.61	7,929.22	8,402.61
Land and building	15,342.95	15,342.95	15,342.95	15,342.95
	$108,951.40	$114,949.47	$121,090.18	$126,869.96
Liabilities:				
Notes payable	$ 25,000.00	$ 25,000.00	$ 21,250.00	$ 18,000.00
Accounts payable	18,750.65	15,583.55	21,934.01	17,352.21
Capital stock	50,000.00	50,000.00	50,000.00	50,000.00
Surplus	15,200.75	24,365.92	27,906.17	41,517.75
	$108,951.40	$114,949.47	$121,090.18	$126,869.96

Exhibit 2

A & B APPLIANCE SALES COMPANY, INC.

CONDENSED PROFIT AND LOSS STATEMENT, 1945-48, INCLUSIVE

		1945		*1946*
Sales		$112,521.78		$117,505.51
Cost of goods sold		71,547.55		79,003.27
Gross Profit		$ 40,974.23		$ 38,592.24
Expenses				
Salaries	$18,528.50		$20,024.20	
Taxes	3,687.22		4,125.89	
Miscellaneous expense	4,872.31		5,286.98	
Total Expenses		27,088.03		29,427.07
Net Profit		$ 12,886.20		$ 9,165.17
		1947		*1948*
Sales		$124,887.33		$139,473.85
Cost of goods sold		83,072.15		89,303.91
Gross Profit		$ 41,815.18		$ 50,169.94
Expenses				
Salaries	$21,217.30		$23,421.75	
Taxes	4,381.95		5,122.39	
Miscellaneous expense	9,924.76		4,764.22	
Total Expenses		$ 35,524.01		$ 33,308.36
Net Profit		$ 6,291.17		$ 16,861.58

Mr. Francis Welch was able to obtain two carloads of refrigerators and one carload of washing machines in February, 1945.

Exhibits 1 and 2 show the condensed balance sheets and profit and loss statements, respectively, for 1945–48, inclusive. Exhibit 3 shows

Exhibit 3

A & B APPLIANCE SALES COMPANY, INC.

TOTAL SALES, BY MONTHS, JANUARY, 1945, TO MARCH, 1949, INCLUSIVE

	1945	*1946*	*1947*	*1948*	*1949*
January	$ 6,271.83	$ 9,155.63	$ 9,258.91	$10,002.73	$ 9,438.21
February	6,589.31	9,021.54	9,378.52	10,616.51	8,715.62
March	6,922.53	9,291.55	9,528.91	10,492.55	6,037.49
April	7,215.27	9,655.33	9,672.33	10,487.31	....
May	7,583.51	9,799.21	9,895.18	10,287.27	....
June	8,122.81	9,931.47	9,840.37	10,793.34	....
July	8,733.46	9,806.28	9,921.32	11,173.56	....
August	9,152.32	9,913.57	10,919.48	11,792.36	....
September	9,935.71	9,935.61	10,845.56	12,637.28	....
October	10,457.19	9,978.54	11,311.29	12,885.93	....
November	10,801.32	9,981.21	11,287.63	12,921.59	....
December	11,436.53	10,825.57	13,027.83	15,393.42	....

monthly sales for the same period. Early in 1949, Mr. Howard Welch observed that sales were showing a noticeable decline and by April, 1949, had dropped to an alarmingly low level. He drew off the balance sheet shown in Exhibit 4, as of April 1, 1949. Inquiry from the electric appliance trade association showed a similar decline in the industry. From some of his competitors he learned the same story of decreasing sales. Of the total indebtedness shown due the bank in Exhibit 4, $8,500 was due on June 1, 1949, and $3,500 on July 1, 1949. The bank notified the firm on March 30, 1949, that it had received a sight draft with bill of lading attached in the amount of $11,000, covering two carloads of washing machines consigned to the firm and requested advice as to its acceptance. The shipment was en route and was expected to arrive in a few days.

Exhibit 4

A & B APPLIANCE SALES COMPANY, INC.

CONDENSED BALANCE SHEET, APRIL 1, 1949

Assets:		Liabilities	
Cash	$ 1,411.23	Notes payable	$ 15,000.00
Accounts receivable	4,137.29	Accounts payable	18,427.91
Merchandise inventory	95,581.62	Capital stock	50,000.00
Parts inventory	9,311.17	Surplus	42,355.35
Land and buildings	15,342.95		
Total Assets	$125,783.26	Total Liabilities	$125,783.26

Because of the changed character of the firm's business in the postwar period compared to the prewar period, the Welch brothers felt they were unable to draw conclusions as to whether the decline was of a temporary nature or something more serious. The radio business had shown some seasonality of movement prior to the war. There was a rise in the spring, followed by a summer decline, with recovery in the fall months. The present experience showed a slump coming in the spring, when the prewar experience had been in the opposite direction. From their trade association and near-by competitors they learned that there had been some seasonal movement in washing machines and refrigerators prior to the war but that it was not always consistent. Electric ranges and refrigerators appeared to show some correlation with new building prior to the war, but this relationship was somewhat cloudy in the postwar period, owing to large replacement demand. It was observed that a similar decline was occurring in residential building in the spring of 1949, and this at a time when it was generally stated that there was a serious shortage of housing and a large backlog of demand for new homes.

Mr. Howard Welch felt it necessary to accept the sight draft, in order not to impair his credit standing with the bank. The original line of credit was recently renewed by the bank. While all obligations had been met on time, he was of the opinion that the bank would be reluctant to extend additional credit on inventory at a time when sales were slow and there was some occasional price cutting in the electrical appliance field. At the same time there was great need of obtaining sufficient cash with which to carry on operations and also to build up a balance with which to meet maturing obligations at the bank in the near future. Mr. Welch believed there were several alternative solutions to the situation confronting him. First, the decline in sales could be interpreted as temporary because of the federal restrictions on installment credit which would expire on June 30, 1949, unless renewed by Congress. He felt, as did many others in the industry, that the relatively high down payments of 20 per cent of the purchase price together with a maximum payment period of twelve months was one of the main reasons for the decline in sales. He might, under this assumption, seek an extension of the maturity dates of his notes at the bank. Second, the decline in sales might be in the nature of a downward trend, reflecting substantial satisfaction of the backlog of demand. This would call for a reduction in inventory within a short period of time in order to obtain sufficient cash. With declining sales this would entail some drastic price reductions. Since about 75 per cent of the heaviest-selling items were priced by the manufacturer under resale price-maintenance acts, this would add to problems of price reductions. Third, if the decline were of a seasonal nature, a recovery would be anticipated in late summer or early fall. If this were the correct appraisal of the situation, a sharp reduction in inventory at present would forego profits which could be made during the recovery period.

QUESTIONS

1. What possible types of economic fluctuations face the A & B Appliance Company? What additional information, if any, would you seek in an attempt to determine the cause of the decline in early 1949?
2. What recommendations would you make if the decline were attributed to seasonal influences? To cyclical factors?
3. If a seasonal pattern of sales were established, would you recommend that inventory policy be based on this factor alone?

Case VI-2: NORTHSIDE INSULATION COMPANY, INC.

In November, 1942, the Model Rebuilders, Inc., of Chicago, Illinois, was organized Mr. John Wilson, Mr. Carl Svendlun, and Mr. Richard Klein. Mr. Wilson was a carpenter and mechanic by trade, Mr. Svendlum had most recently worked as a plumber and electrician but had been in business as a plumbing and heating contractor several years earlier, while Mr. Klein was employed as a salesman for a metals novelty company until that company was forced to suspend operations because of the war. Model Rebuilders, Inc., was organized primarily for the purpose of remodeling old and larger homes into smaller apartments to meet the increased demand for housing because of wartime activity. The government had established priorities for all the necessary materials to permit such work. The three incorporators each contributed $5,000 in cash toward the capital of the firm. In addition, Mr. Svendlun contributed some material in his possession which was suitable for use by the firm, so that the total original capital was $28,500. Mr. Wilson and Mr. Svendlun made estimates and performed work on the various projects of the corporation, while Mr. Klein concentrated upon sales and the obtaining of priorities.

The company prospered under this arrangement. Each incorporator was paid a salary for his services, and profits were reinvested in the firm. By September, 1945, the company had accumulated a capital and surplus of $193,457.20 and had an average of 61 employees on its payroll. Practically all its work had been of an interior nature, that is, the removing and building of partitions, construction of new bathrooms and kitchens, resetting windows, etc. The firm had never undertaken any new building of any kind, although it had taken several subcontracts from builders who were working on government construction projects during the war. All three of the original incorporators were now engaged in supervisory work only, and Mr. Klein had two assistants.

In October, 1945, Mr. Klein called to the attention of Mr. Svendlun and Mr. Wilson that there was a decline in the amount of remodeling work available. Mr. Klein was of the opinion that, with the end of the war, people were anxious to get out of small living quarters and into larger apartments or in individual homes. In addition, there seemed to be a growing shortage of certain materials, many having been freed of priorities by the government. After several conferences it was agreed that the firm should either enter the general contracting business to build new and complete structures or seek another field of specialization where materials were more easily obtainable.

Among the materials in most plentiful supply were rock-wool insulation, roofing materials, and certain types of windows and doors, particularly those made of aluminum. After some preliminary negotiations, the firm obtained a franchise to distribute and install a combination storm and screen window made of aluminum, metal thresholds, weatherstripping, insulation, roofing, and the sale and maintenance of oil and gas furnaces and boilers. The combination storm windows, thresholds, weatherstripping, furnaces, and boilers were produced by a manufacturer with a national reputation for quality products. The insulating and roofing material was purchased by the firm from various manufacturers according to desired specifications. On January 1, 1946, the firm was reorganized and its name changed to the Northside Insulation Company, Inc. With the exception of furnaces and boilers, all products were promptly delivered, and the company enjoyed a profitable business.

Subsequent to its reorganization in January, 1946, the company employed ten salesmen upon a salary and commission basis. An average of 75 employees was retained on its payrolls. Skilled labor was hired at straight salary on a weekly basis, while unskilled labor was hired by the hour as needed. Skilled labor consisted of carpenters, mechanics, steam-fitters, drivers, and office employees. Unskilled labor was used principally in loading operations. Mr. Wilson was quite insistent upon work of only the highest quality, as that was one of the company's main selling points. Orders were sufficient to maintain a backlog of 30–90 days. This situation prevailed until the fall of 1948.

In March, 1949, Mr. Klein called a meeting of the owners of the firm to discuss what he considered to be a troublesome situation. He noted that sales had been declining for several months and that backlogs of orders had completely disappeared except on some special items which required some time for processing at the factory. This had brought about considerable idle time among the skilled labor. Mr. Klein was uncertain as to whether the situation was temporary or whether it was the beginning of a postwar depression, which for several months had been forecast. Mr. Wilson and Mr. Svendlun were of the opinion that to protect the company's interest there should be an immediate reduction in the skilled labor, so as to reduce costs in line with the reduction in sales. Mr. Klein was somewhat hesitant about this policy, since the market for skilled labor in the building trades was rather tight and if such labor were released now it might be difficult to obtain satisfactory replacements if business should pick up later. Company sales, by months, are shown in Exhibit 1. The monthly volume of business transacted by the predecessor company, Model Rebuilders, Inc., is shown in Exhibit 2.

Exhibit 1

NORTHSIDE INSULATION COMPANY, INC.

MONTHLY SALES OF INSULATION AND HEATING DIVISIONS, JANUARY 1, 1946, TO FEBRUARY 28, 1949

(00's Omitted)

Month	1946		1947		1948		1949	
	Insulation Div	Heating Div	Insulation Div	Heating Div	Insulation Div	Heating Div	Insulation Div	Heating Div
January	$14,126	$ 6,354	$25,119	$ 9,211	$30,792	$12,683	$25,311	$10,051
February	15,963	6,391	24,996	9,371	30,514	13,119	23,657	8,735
March	16,004	7,119	25,314	9,514	32,718	15,212		
April	18,327	7,812	26,111	9,569	33,511	16,109		
May	21,571	7,903	26,413	9,741	32,573	17,911		
June	21,439	7,907	27,004	9,855	32,419	18,304		
July	21,783	7,962	28,110	9,867	33,479	18,115		
August	21,790	7,993	29,535	10,053	32,135	17,215		
September	23,801	8,573	30,007	12,519	31,419	15,219		
October	26,591	10,270	30,459	12,314	30,515	13,211		
November	25,935	9,971	30,231	12,692	28,433	13,733		
December	26,011	9,431	31,115	12,703	27,116	11,179		

From his salesmen and company records Mr. Klein learned that about 75 per cent of the total business in the insulation division was on homes already built. The storm sash could be custom-fitted to windows of any size or shape and was easily changed from winter to summer use by merely raising the storm window section and lowering the screen. In existing structures insulation was blown in by means of pressure machinery, which the company owned, while in new building it was applied in "bats" or sheets. Both of these items were relatively expensive and were more in the nature of a capital outlay by a homeowner than a current expense.

From January, 1946, to January, 1948, about 90 per cent of these sales were for cash or payment in 90 days. By December, 1948, cash sales had decreased to about 70 per cent of total sales. Credit sales were handled primarily through Section I of the Federal Housing Act, which permitted the purchaser to make installment payments over a maximum period of 36 months. Actual financing was done through the firm's bank, and such loans were guaranteed by the FHA. The remainder of the credit sales was financed by the same bank over a twelve-month period. Such installment notes were indorsed, with full recourse, by the Northside Insulation Company.

Exhibit 2

MODEL REBUILDERS, INC.

TOTAL VOLUME OF BUSINESS, MONTHLY, 1942-45, INCLUSIVE
(00's Omitted)

Month	1942	1943	1944	1945
January		$15,543	$41,782	$50,152
February		17,961	42,385	49,131
March		19,547	47,981	45,110
April		23,615	49,583	45,060
May		27,435	51,572	45,111
June		31,693	53,591	45,130
July		37,591	54,352	43,176
August		39,983	55,131	42,015
September		41,573	55,431	39,325
October		41,374	55,019	37,192
November		41,561	53,215	33,251
December	$11,542	40,963	51,901	30,197

Sales in the heating division were about 50 per cent replacement in existing structures and the balance in new construction. The firm usually bid for the new construction business on a subcontract basis to local general contractors. Sales for new construction were almost all cash on a 30- to 60-day basis. Payment was made by the contractor within a reasonable period after installation was completed. Sales for replacement were about half cash and half credit, the latter being financed on an installment basis similar to those in the insulation division.

From the information outlined Mr. Klein considered the following possibilities: (1) that prospective purchasers had less cash to spend than formerly and were reluctant to go into debt (salesmen's reports did not confirm the latter); (2) that the decline might be of a seasonal character in the process of development; (3) that the replacement market was becoming saturated; or (4) that a general decline in economic activity was developing. Each of these possibilities was looked upon as an alternative and, therefore, would require different courses of action. From trade sources Mr. Klein learned that other firms in the industry were undergoing experiences similar to his. Mr. Svendlun, on the basis of his previous business experience, was of the opinion that it was a seasonal factor which had not yet appeared because of the postwar backlog of demand. None of the owners of the firm gave much weight to the idea of saturation of the replacement market, while the fourth possibility was strongly discounted.

Mr. Klein believed that more liberal credit terms as to length of installment contract and size of monthly payment would alleviate the first condition, while the second would require either some effort to prevent the seasonal pattern from developing or possibly the addition of some other line to offset the seasonal decline. Mr. Klein proposed that, as an inducement to have insulation and storm sash installed during the spring months, the firm offer to make the installations immediately, with no payment due until October first following. The customer would have the option of making a cash payment in full on that date or having the first payment of an installment loan fall due on the same date. The firm would provide the credit without charge until October first. If the customer preferred an installment contract, the firm could sell the note to its bank in the ordinary manner. He believed that, as long as the prospective purchaser would probably buy in the summer or early fall anyhow, he would be equally willing to purchase at an earlier date if no additional cost were involved. If such a plan were successful, the firm would be able to schedule its installations in such a manner as to make more efficient use of its labor force and permit the retention of its present staff of workers. In presenting the plan it was pointed out that the gross margin of profit in the insulation division was about 50 per cent and about 35 per cent in the heating division. The firm possessed government bonds in excess of $200,000, which bore interest at a rate of slightly more than 2 per cent.

QUESTIONS

1. What action would you propose the company undertake?
2. From the information presented do you believe the decline in sales was a seasonal or a trend factor? How do you reach such a conclusion?
3. Would you recommend the use of the company's funds in the manner proposed? Why? Would you suggest that the firm carry its own installment paper at the going rate of 4½ per cent rather than finance it through a bank?
4. What additional information do you feel the company should have had before reaching a decision? How would you make use of such information?

Case VI-3. BABY FOOD INDUSTRY

The entire text of this case is reproduced, by permission, from the *Wall Street Journal* of June 23, 1949.

An epidemic of competitive selling is sweeping the industry that makes food for infants.

There's good reason. People who ponder birth rate statistics say the great post-war baby-having wave reached its crest last year. They see a steep slide from now until 1955. Baby food packers who supply specially prepared fruits, vegetables, meats and soups to an estimated nine of every ten U.S. infants, face the loss of a third of their potential market.

In 1948, says the U.S. Census Bureau, the infant population (babies under two years) reached a record high of 7,400,000. By the end of the year their numbers are expected to drop to 6,800,000. Six years from now the figure will be back to the 1940 level of 4,700,000, population experts predict.

How to buck this ebbing market is the problem worrying baby food producers. In the last eight years, by riding the birth curve upward, they've turned a little business into a big one. From around 254 million cans of strained and chopped baby foods produced in 1940, the pack grew to 1,500 million cans last year—about 6 per cent of the total pack of canned fruits and vegetables. Sales, at the retail level, soared to nearly $126 million last year from $20 million in 1940.

The business is divided by five major baby food packers—Gerber (the biggest), Heinz, Libby, McNeill, and Libby, Clapp's and Beech-Nut—and a handfull of small firms. In addition two specialists have an important stake in the industry. Campbell Soup Company puts up five varieties of baby foods, and Swift and Company turns out a large quantity of baby meats. All the major packers, except Gerber, also produce general food lines.

The industry's plants are strung across the country—from Canajoharie, New York, to San Jose, California, but the west coast, especially California, with its big production of fruits and vegetables is the primary center of production.

From now on as the birth rate declines, all these companies look for a period of tougher competition. "That factor is already being considered in packing schedules and plans for sales campaigns," says a Gerber executive.

"Competition is already keen, but it's certain to get keener," adds a major eastern packer.

Along with their special birth rate problem, baby food packers are also feeling the public's general pinch-penny buying sentiment. Explains a western canner:

"People who've been buying four or five cans a day have begun cutting down. They make their baby foods stretch farther, just like everyone else. Now when junior doesn't finish the can, mama puts the leftovers in the refrigerator to use the next day instead of throwing it away."

The packers with no intention of riding this curve back downward are reshaping and sharpening up their selling strategy in the hope of stirring up some trends in the other direction.

"One theme we are going to emphasize is to get mothers to feed more commercial baby foods to their children," says one sales executive. "We think we provide purer and cheaper foods than mothers can prepare themselves, and there's no doubt that it's easier for the mother."

"There's no reason why we can't build the sales curve back up and even go beyond it," adds another packer.

Another line of attack: Go after the non-users of commercial baby foods.

"Some packers think that about 90 per cent of the babies are already eating at least some canned or glassed baby foods," comments the sales chief of one firm. "I don't believe it is that high. Even if it is, that 10 per cent of non-users is worth going after and we intend to do it."

Adults aren't being overlooked either in the race to keep volume up. Packers have never applied their yardsticks to adult consumption of baby foods, but they are getting curious about its possibilities. Most adult consumers are aged or sick persons (stomach ulcer patients, for example) who require foods that are easily digested.

Packers have a variety of sales weapons to use in their competitive struggle for customers. They aim their main appeal towards two key persons in the baby's early life: its mother and its doctor.

Sales departments cull birth notices for vital statistics and gently bombard the new mother with coupons and cards entitling them to free cans of baby foods

"We figure if we can get them started early on our brand, we have a splendid chance of keeping them as customers all the way through the baby food stage," says E. J. Burley, sales manager for the western division of Libby, McNeill, and Libby.

The give-away program is geared to the baby's progress too. Clapp's tacks up coupons on grocers' baby food shelves, offering an initialed baby spoon for payment of 25 cents and three labels from its baby foods or one box top from its cereals. Libby offers a comb and brush set for 50 cents and six labels and a "lullaby lamp" for 35 cents and six labels.

Pediatricians get special attention from baby food producers. Most firms send them pamphlets and offer to provide them with free samples of food in the hope that the baby doctors will hand the sample to new mothers. They sometimes present pediatricians with such promotional gadgets as automatic pencils and note pads.

"There's no doubt that if we can get a doctor to hand a new mother a certain brand of baby food as a sample we've just about got her as a permanent customer," says a salesman.

"One time I spent six months in a town doing nothing but personally contacting pediatricians and head nurses in hospitals and getting them to give mothers our samples. We raised our sales from third to first place," reports another sales executive.

Another front line for salesmen is the grocery store where they battle for "shelf" or display space for their brands. In areas where competition is stiffest, some firms employ "merchandise men" or "junior salesmen" in addition to their regular salesmen.

The junior salesmen do little beyond making the rounds of grocery stores and keeping their display counters filled with their brands. They find that larger, busy grocery firms sometimes neglect the baby food shelves because the small baby food cans are harder to stack and tedious to handle. The small fry cans average 4½ ounces compared with 1 pound, 14 ounces in the No. 2½ cans of regular line foods.

So far the population "recession" hasn't hit baby food packers hard. They have been able to follow the population "wave" of 1948 from the strained baby food age on into the second year of chopped, or junior, food age.

Strained foods, which are forced through fine screens until they resemble purees, are designed for babies from three to 12 months or more. Chopped foods, which are bulkier, are made for babies up to two years of age. A few continue to eat them beyond that age but the drop-off is sharp after two years. By that time, babies are eating about what mama and papa eat.

Packers this year are putting up more chopped foods for the heftier appetites of 1948-born babies. By next year, however, they will be "graduated" out of the baby food class entirely—meanwhile there will be fewer new strained food eaters.

Baby food packers are continually experimenting to bring new foods on the market and broaden their appeal to infants' tastes. Several firms are now testing strained plums, for example. Sweet potatoes and squash took their places alongside other standard packs. Other products are fading out. Packers say the youngsters are winning their war against strained and chopped spinach; demand has nearly disappeared.

Gerber started out with five products in 1928. Today it markets 22 strained foods, including fruits, vegetables, custards, and meat-vegetable meal combinations, 15 chopped foods for juniors, three baby cereals, three strained meats, and three junior meats. Most of the major packers have an equally varied array of foods.

Except for Beech-Nut, which packs only in glass containers, all the larger packers use both tin and glass. On the east coast mothers prefer glass almost exclusively, while on the west coast the preference is exactly reversed in favor of tin. Packers don't know why. They are closely watching the recent move of Beech-Nut into the western market with its glass pack. It has just completed arrangements with brokers for distribution of its glass packed products in Los Angeles and San Francisco.

QUESTIONS

1. What is the underlying cause of the expected increase in competition in the baby food industry?
2. Do you agree that the efforts of the individual packers to maintain their share of the market is the proper way to attack the problem? Would you suggest that the collective efforts of the packers, e.g., through a trade association, would obtain better results? What sort of efforts should group action take?
3. Is there any evidence in the text that some of the expected decline may be due to factors other than the decline in the birth rate? What is it? Does this factor appear to be of major or minor importance?
4. What is the chief substitute for prepared baby foods? Does this affect the price policies of the industry?
5. Would you suggest price reductions by the individual firms as a partial answer to the expected decline in demand? Why? In what competitive area would you recommend that the firms concentrate their efforts?
6. Is the Gerber company in a different position than any of the other firms? Do you think they should follow a different policy than other firms? Why?
7. Is there any evidence of horizontal maladjustment in this industry?

Case VI–4: FORECAST OF TRUCK SALES IN 1950

The entire text of this case is reproduced, by permission, from the *Wall Street Journal* of February 23, 1950.

Truck makers advance a theory that the industry generally will sell far fewer trucks this year than last. But almost every important producer behaves as if he expects to sell more—by scheduling big production.

Perhaps the optimism springs from the fact truck makers have been sprucing up their models, paring some prices and teaching salesmanship to their dealers. This seems to have paid off in January, with some makers reporting record sales.

The pessimism come from the very best people, however. That semi-official industry oracle, Ward's Automotive Reports, thinks only 850,000 trucks will be made in the U.S. this year. That would be a 25 per cent drop from last year, a 37 per cent decline from the peak production of 1948.

Sales officials of leading manufacturers generally go along with this. Both J. W. Burke, Chevrolet's truck sales manager, and E. C. Quinn, general sales manager of Dodge division of Chrysler Corporation, think total domestic sales will be down about 800,000 units, and exports will be even smaller than last year, when they made up only 11.2 per cent of production. (Before the war they ran 20 per cent or higher.) J. C. Ball, Ford's manager of product sales and services, suggests his colleagues may be a little too gloomy, but agrees the statistics will record a slide. Yet each of these three gentlemen insists his own company's outlook is very good indeed, at least if the dealers really go after the business.

Chevvy, biggest of the lot, has stepped up the horsepower of its engines and is making the most of it by splashing ads proclaiming the "most powerful trucks in Chevrolet history." Unless prevented by some outside influence such as a prolonged coal strike, it aims to top 1949 output in each of the first six months of 1950.

Ford, which has made a score of improvements and changes in its 1950 trucks, and cut prices $20 to $80 on all but its largest models, is about to launch an intensive truck sales training program for its dealers. With additional wheelbase options, it is proclaiming in ads the "broadest selection" ever. It is scheduling output of 180,000 trucks in the first six months of this year, which would be the biggest such period in its history.

Dodge has trimmed its prices, too, by as much as $125, and is plugging the slogan: "Priced with the lowest." After adding a four-ton truck to its line it is also heralding "more basic models" than ever. This does little good at the moment, with assembly lines idled by a strike, but when that is over Dodge expects to come back with a manufacturing rush that will carry its output for this full year up to equal 1949.

International Harvester, fourth of the "big four," aims to beat its production of last year. It spent $30 million preparing its current models, which feature more powerful engines, cabs that are more comfortable and easier to see out of, new styling and mechanical changes. Its line includes new intermediate sizes.

If the big producers are correct in their pessimism about industry sales, and are right in their optimism about their own sales, it means they will be seizing a larger share of a shrinking market. That trend was noticeable last year, when they accounted for 78.7 per cent of the industry's production, compared to 75.3 per cent in 1948. It could be that the big four are gradually regaining the 82.2 per cent of the market they held back in 1939, before wartime military orders and post-war scarcity of trucks for civilians gave the smaller companies a glittering opportunity.

But at least some of the smaller truck manufacturers refuse to feel depressed. They've got ambitious plans of their own. A spokesman for White Motor Company, for instance, which has added a new lighter truck to its line, looks forward to an increase in sales volume. Autocar says sales of its heavy models "have been improving at a slow but steady rate" after weakness in 1949.

The forecast of a diminishing market for all trucks in 1950 is based on three ideas: The export market will contract because foreigners haven't conquered their dollar difficulties. The deferred domestic demand of war years has now been satisfied. Lower agricultural income means less buying by farmers, who now own almost 30 per cent of all trucks in the United States.

Statistics can be used in more cheerful fashion, of course. There are still about 2,500,000 trucks 10 years or more in age, and these should be replaced, auto makers figure. That alone would take a couple of years at last year's rate of production.

Brightest spot in the picture is the increasing use of trucks. Registrations jumped from 4,875,000 in 1941 to 7,670,000 at the end of 1949, according to the Automobile Manufacturers Association, and one company official argues that the average truck is piling up more mileage nowadays so will have a shorter life.

Well, how has truck production actually been running thus far in 1950? It started out with a rush that belied the experts' fears. Chevrolet, Ford and Dodge all reported the best January sales in their histories, and truck production by all U.S. factories from January 1 through February 4, rose to 110,000, an increase of 4,000 from the similar period of 1949. By February 18, however, the total for the year to date had mounted only to 156,136; it was lagging nearly 30,000 behind last year's pace. But this was apparently more the result of the strike at Dodge plants and a suspension of assemblies at Willys than evidence of any general weakening in demand.

In February last year dealers all over the country were reported cutting prices on medium and light-heavy trucks because those sizes were accumulating unsold. Word now is there is much less price cutting. Dealer inventories are better balanced, in part because in 1949 manufacturers shifted about 70 per cent of production to light duty models, compared with only 55 per cent in 1948, and a pre-war average of about 50 per cent.

The major companies fell short of recapturing their pre-war share of the market last year mainly because of the larger-than-prewar share held by the top three of the smaller producers. These are GMC Truck & Coach Division (second entry of General Motors Corporation, the first being Chevrolet), Studebaker and Willys-Overland. GMC was the industry's fifth ranking truck maker before the war, but the other two were far down the list. Last year the three did 17.4 per cent of the nation's truck producing business. In 1939, they accounted for only 7.8 per cent. While the small producers, as a group, were slipping in percentage of total output from 1948 to 1949, GMC and Studebaker actually showed an increase.

Studebaker's ability to hang on in the developing buyer's market of the last year or so has been one of the big post-war surprises in the truck industry. Another was the unexpectedly large number of Jeeps sold by Willys up to the middle of last year. These vehicles are classified by the Government as trucks and were responsible for bringing Willys into fifth place among truck producers in 1946, 1947, and 1948. Last year, however, Willys fell to seventh place, with its output of Jeeps and light trucks less than half the 1948 figure. But it was still far ahead of pre-war.

Most of the other small producers—firms like Mack, Diamond T., White, Reo, Federal, Divco, Autocar and Brockway—were also squeezed into a smaller share of the nation's truck output last year. This year the competition of the big companies promises to be even tougher, but industry men say the three middle bracket makers—GMC, Studebaker and Willys—may feel the pressure most. The small makers have all been getting ready for the sales fight. GMC stepped up the horsepower of its light and medium duty truck engines in December, made a number of cab and chasis improvement and added several new models.

	1949	Per Cent of Total	1948	Per Cent of Total	1939	Per Cent of Total
Chevrolet	383,543	33.9	369,690	28.5	244,700	35.6
Ford	244,613	21.6	301,791	22.0	153,981	22.4
Dodge	151,513	13.4	172,020	12.6	85,557	12.5
Int. Harvester	110,572	9.8	166,784	12.2	80,260	11.7
GMC	83,840	7.4	92,677	6.8	44,036	6.4
Studebaker	63,473	5.6	67,983	5.0	7,100	1.0
Willys	49,973	4.4	104,980	7.7	2,800	0.4
Mack	9,025	0.8	11,570	0.8	10,060	1.5
White	8,707	0.8	12,507	0.9	9,258	1.3
Diamond T	5,545	0.5	12,684	0.9	8,930	1.3
Reo	3,600	0.3	11,425	0.8	1,812	0.3
Pontiac	2,400	0.2				
Federal	1,649	0.15	3,898	0.3	3,255	0.5
Nash	676	0.06	1,051	0.1		
Plymouth					14,500	2.1
Crosley	375	0.03	2,673	0.2		
Hudson	..		..		850	0.1
Miscellaneous	12,544	1.1	17,703	1.3	19,727	2.9
Total	1,132,138		1,369,472		686,835	

Reo is counting on its new "Gold Comet" engine and an expanded model line to keep it in the running. It is about to begin shipments on a $31 million military order obtained last summer.

Federal Motor Truck Company is planning to introduce new models this year and its application for a $1 million loan to cover tooling expense has been approved by the Reconstruction Finance Corporation.

Mack Truck will spend three times as much as last year to push sales of its heavy-duty trucks. It plans to step up advertising in trade publications, popular magazines and direct mail. The company is also offering free courses for mechanics in diesel truck and bus maintenance. In the New York City area the classes were so popular Mack had to hire the huge Manhattan Center to handle applicants.

The table on page 455 compares 1949 output by the various truck makers with 1948 and pre-war 1939 figures. It also includes each company's percentage of total production. The figures are supplied by Ward's Automotive Reports.

QUESTIONS

1. How would you explain the fact that, while the demand for the truck industry apparently is expected to be lower in 1950 than in 1949, almost all the truck producers are planning a higher output in 1950? Would this not indicate that there may be excess capacity in the industry before the end of 1950?
2. What is the nature of demand for trucks? Does the fact that they are durable goods play any part in forecasting production for the coming year?
3. Would you, as one of the smaller producers listed in the table, have any reasons for increasing output in the face of declining demand for the industry? What additional data or facts would you desire in making such a decision?
4. Are there any indications that the truck industry may be afflicted with overinvestment? Would you, as a truck producer, enter upon a program of expansion of capacity at this time?
5. What are some of the factors affecting the demand for trucks?

Case VI–5: ACME-WESTERN MACHINERY COMPANY

Mr. Paul Bigelow, president of the Acme-Western Machinery Company, in reviewing the company's operations for 1949, noted that there was a decline in the production of heavy tools and equipment. The company manufactured heavy machinery for the construction industry. Its chief products were trucks, bulldozers, power shovels, and loading machinery. In addition, it produced heavy concrete-mixing machinery and builders' concrete-handling equipment. None of the trucks was of less than eight-ton capacity and were usually built to order. While the bulldozers and power shovels were more standardized, they were of a very heavy type and were manufactured by only two other firms in the United States. About 65 per cent of the company's business consisted of building equipment to specifications. The company maintained a staff of engineers who either visited jobs where such equipment was needed or assisted contractors in drawing up equipment specifications for their particular type of work.

The company was organized in 1925, for the purpose of building road-maintenance machinery. In that year Mr. Bigelow produced a machine designed for the upkeep of dirt and gravel roads. By 1930, the company built some road-construction machinery and ditch-digging equipment. It was not until the second World War that the company began to build large, heavy-duty equipment on a large scale. To meet the increase in demand for its equipment, the company had about doubled its capacity as of 1940. The company operated its own foundry and machine shops. Motors for the trucks and other power equipment were purchased from other firms and usually were standardized. The motor manufacturers and the Acme-Western Machinery Company often engaged in joint research for the purpose of designing more powerful engines as larger and heavier equipment was demanded.

The price policy of the company had always been one of cost of labor and materials plus a percentage for overhead and profit. The accounting department had developed a system of standard costs which were frequently checked and revised in an attempt to keep in line with actual costs. The company had shown an annual profit from its organization through 1930, when the impact of the depression caused a sharp curtailment of operations. Prior to 1930, production had been at an average of 90 per cent of capacity. During the early thirties, operations dropped as low as 5 per cent of capacity, and as a result the company suffered deficits from 1931 to 1935, inclusive. Practically all the operations during that time consisted of the production of parts, with occasional orders for a new piece of equipment. The company entered the depression with a sizable inventory of parts, so that little production of these was undertaken early in that period. In an effort to keep costs at a minimum, the company purchased parts and sublet jobs to other firms if the price quoted was lower than the company was able to meet in its own plant. In 1936 the company showed a small profit, but a heavy loss was incurred in 1937, with the sharp recession of that year. Subsequent to that year the company had shown an annual profit.

The main products of the company were relatively expensive and of high durability. A ten-ton earth-mover truck, for example, sold in 1949 for about $30,000–$40,000, depending upon specifications. A concrete mixing and loading plant, which could be assembled and disassembled for movement from job to job, with a capacity of 425 yards per eight hours, sold for about $60,000–$75,000, according to specifications. The first ten-ton truck built by the firm in 1934 was still in operation, as was the first gravel loader, built in 1927. Some of this equipment had been modernized by rebuilding. There was also the problem of used equipment, especially in periods of low construction activity.

In February, 1950, Mr. Bigelow attended the convention of the Associated General Contractors of America, Inc., at San Francisco, California. The attitude which prevailed at the convention and which was shared by Mr. Bigelow, is described in the following column which appeared in the *Wall Street Journal* of March 2, 1950:

> This country in 1950 will probably see the biggest volume of building in its history—but, brother, will the competition be fierce!
>
> That's the chorus coming from 1,500 building contractors meeting here this week for the annual convention of the Associated General Contractors of America, Inc. They're the men who lay the nation's roads, build the dams and factories, the skyscrapers and apartment houses. You'd think they'd be singing a hymn of rejoicing. They are wailing the blues.
>
> The reason is simple: Too many builders. A good index to their mushrooming growth is the membership roster of the Associated General Contractors. In 1939, members numbered 2,300. By January, 1945, the roll called had expanded to 3,161, and four years later, on January 1, 1949, there were 5,009. Another 502 firms joined last year, the total now is 5,511. This figure takes in almost all the big building firms, and the trade association says its members do 80 per cent of all U.S. contract construction. But there are thousands of other small contractors, and their ranks have swelled, too. The A.G.A. estimates there are more than 32,000 contract builders in the country today.
>
> But building volume hasn't increased recently at that pace. This year, estimate statistical experts of the Associated General Contractors, total U.S. construction will hit $30 billion–$20 billion in new building and about $10 billion in maintenance and repair work. That $20 billion guess —should it come to pass—would be a slight $700 million more than the 1949 record of $19,300 million of new building. At the wartime peak, where there were only a little more than half as many contractors as now, new construction totaled $18 billion.
>
> That discrepancy means contractors are at each other's throats on almost every job that comes on the market. Nearly all non-residential building is awarded on a bid basis. Result: they've had to trim profit margins, often to loss levels, to beat out the other fellow. That trend, which began last year, is certain to grow in 1950, say builders from coast to coast.
>
> In San Diego, for instance, where a 10 per cent increase in construc-

tion is expected this year, as many as 30 bidders for medium-sized highway jobs are reported. "Up to last year the average public project would draw five to eight bidders," says John A. Volpe, of the Volpe Construction Co. of Malden, Mass. "We recently bid against 19 others for a high school job."

In Spokane, Washington, 13 to 15 bidders are reported as "average" these days and a lot of contracts attract as many as 25 to 30. In Los Angeles, where 1950 construction is expected to set a new peak, competition has reached a frantic stage. John MacLeod, president of the Macco Corporation there, reports, "One project in the million dollar class recently had 33 bidders."

New York's F. H. McGraw & Company—not a member of the Associated General Contractors—agrees there are "too many contractors bidding for each job." Relates an official: "We submitted a bid for an industrial plant, believing we were one of three bidders. We later discovered there were 30 bids submitted. If we had known there were going to be that many, we wouldn't have bothered."

Adds Gayle Armstrong, of Armstrong & Armstrong located in Roswell, New Mexico: "I bid on a dam job in Texas about two weeks ago. There were more than 20 bidders. Our bid was about $3 million. I figured we'd get beat by $300,000 to $400,000. Actually the low bid was around $2 million and the average was around $2,700,000."

Bidding for contracts can be expensive. One company estimates the cost of preparing a bid for constructing a $2 million industrial plant might run from $2,000 to $5,000—with all the odds against its acceptance. An executive tells of another firm that submitted bids on 85 jobs before it was awarded one. In Kentucky, a month ago, the low bid on a piece of highway construction was $836,087. Before the bidding, state road engineers had estimated it would cost $1,012,887 to do the job.

Another problem that general contractors have to contend with is the growing practice of contract splitting. An industrial firm, for instance, planning to put up a new plant, asks for one set of bids for excavation work, another batch for plumbing and heating, and still a third for installation of machinery. Contracts are awarded separately for each type of work to the low bidder in that field.

How do builders feel about this trend? A Portland, Oregon contractor, Donald W. Hall of E. C. Hall & Company, sums up the mood: "We're doing more work, but on much smaller margins than ever before. Our capital investment is a great deal larger than ever and, frankly, many of us are beginning to worry about the future." But there's also a bright side to this picture. "At least the customer should be happy—he's getting more for his money than he has in years," remarks a midwestern contractor.

The bidding battle has already resulted in building "prices" dipping an average of 10 per cent from the peak reached late in 1948. Costs of some kinds of work have come down more than others; some fees are still declining, others have more or less stabilized. The contractors' association has just completed a poll of its members on cost trends. This survey, covering all parts of the nation, shows the cost of building new factories, stores and big apartment houses now averages 8.5 per cent under the 1948 high. Contractors think that figure will stay steady through 1950. Heavier construction—dams, bridge, railroads and large public works projects—now cost 10 per cent less and builders look for some "stability" in that division. But the "price" of highly competitive highway work is still sliding, with the average decline nearly 13 per cent.

Of this year's looked-for $20 billion in new building, about $2 billion is expected to go into road projects (1949 road work cost $1,700 million); some $6,500 million for one-family type houses ($500 million more than last year), another $6,500 million (about the same amount as in 1949) for heavy construction, such as big public works, pipelines, railroads, dams and the like, and the remaining $5 billion for factories, stores, apartment houses and smaller public works, such as school or hospitals, is expected to be some $300 million below last year.

The contractors foresee a shift this year toward less private construction. Based on their survey, they predict a decline in industrial building, such as new factories, will more than offset an expected increase in new housing. They estimate $13,500 million of the year's anticipated $20 billion in new work will be for private construction and the other $6,500 million for public works. Last year the ration was $14 billion, private and $5,500 million public.

Except in the housing field, building men believe construction volume will hold at a high level for several years. But how long can the present intense competition continue without undermining the industry? There'll be a natural readjustment, some prophesy, during this year. "It looks," says an east coast contractor, "like the start of the battle to weed out the weak ones." Some weak ones, it would appear, are already dropping by the wayside. Dun & Bradstreet counted 65 building contractor failures during January, up from 53 in the similar month last year. The number laying aside hammers and hods during all of 1949 was 838—91 per cent over the 1948 casualty list. This mortality increase was more striking than for industry as a whole which last year ran 76.1 per cent over the 1948 figure.

Many builders trace the roots of their troubles back to wartime. Then, many building organizations grew to huge size to meet the demand for swift-paced construction of airports, army camps and other defense needs. Now many of these firms are reluctant to shrink in size or to reduce their key personnel. Consequently, they have too much plant, men and equipment for the work available. They have to keep bidding to keep their machinery busy. "The whole construction industry is out of kilter," claims a southwestern contractor. "The tendency is to put more equipment on a job and do it faster. That's what is eating up the volume so fast. Some outfits take jobs when they know they haven't a chance to make a profit. They've got equipment on which they have to meet payments so they take the cheap jobs." Adds Walter L. Couse of Detroit:

"There are a large number of firms which have entered the field during and since the war and not yet reached stability. They take anything to keep busy, and, in a lot of cases, have only gotten in deeper. Some large firms doing the same thing can stand the losses better, but their lower bids force others out."

Some old-timers in the business are trying to "wait out" the situation by bidding only on a profitable basis. Says F. W. Parrott, president of C. F. Lytle Company of Sioux City, Iowa: "When we bid on a job we do it on a conservative basis in the hope that some day bids will be let that way again. That means that right now only half our plan and top personnel is occupied. The overhead is eating into our reserves. We went through the same kind of a cycle in the middle 30's." One of the West Coast's biggest building firms has stopped bidding on highway work. "It's too competitive for us," declares an official. "The people who are bidding are losing their shirts."

Often firms which have decided to submit low bids find ex-employees competing with them. In New England, reports an eastern builder: "There are still more contractors coming into the field than going out. The newcomers are mostly men who worked as estimators, managers, or superintendents for other contractors. Some are finding the pasture is not as green as they expected."

If a contractor wants to stay in the bidding against the pressure of sharp competition, he has to do so, say builders, against costs that have not dropped nearly as fast as the bid in prices. "There's no sign of labor costs coming down this year," reports Paul Frederickson, of Seattle. Adds M. C. Harrison, of Pittsburgh: "When we see excavation work going on for as much as 30 per cent below our cost estimates in a territory where wages are unionized and holding stable, we know the pinch is tight." Other builders say a greater efficiency on the part of workers is helping offset only a part of high wage costs. Some materials prices have eased, contractors report, but most building equipment "is not down a dime" according to one contractor who says his investment in machinery is more than double the pre-war cost. L. M. Denton of Detroit, concurs: "That amount you have to have in order to keep yourself in a strong competitive position means at least 25 to 30 per cent more machines than were necessary before the war." C. P Street of McDevitt & Street Company, located in Charlotte, North Carolina, comments: "There haven't been sufficient decreases in labor or material costs to justify the price decreases since October, 1948. Some of the latter decline has come about through increased efficiency of labor and lower sub-contract prices, but lower general contract prices have mainly stemmed from over-eagerness."

In some parts of the country, contractors are also worrying over a downtrend in private industrial and commercial construction, offset only by a corresponding uptrend in public works. Says and East Coast builder: "Only work involving public funds has kept the market up at all in our area lately. So far the situation is not alarming. Private postwar construction has more or less caught up and institutional and public building that's held back is now going ahead. At the moment, the proportion is distorted in favor of public building. But if this trend continues it will worry us." A Long Beach, California, builder adds: "If municipal construction were to stop, the construction industry would be in a very serious condition. This prospect is ominous."

Upon his return from the convention Mr. Bigelow called a meeting of his board of directors and outlined the situation to them. Two of the directors proposed that the company immediately make a general reduction in prices, so that volume of output might be maintained. Mr. Bigelow pointed out that to do this would mean a reduction in the profit margin, since there was no indication of a decrease in the company's labor costs and there was considerable rumor that there would be an increase in the price of steel. Mr. Bigelow had advised the directors at an earlier meeting that a decline in output was to be expected in 1950, but since attending the convention he was more pessimistic as to reaching the level earlier proposed. This meant that unit costs would necessarily rise somewhat. To this, the same two directors favored an immediate price reduction to increase the volume of sales.

QUESTIONS

1. Do you agree with the two directors who proposed a price reduction?
2. What is the nature of demand for heavy equipment in the building industry?
3. Is there any information in the newspaper account which would indicate that the market for heavy builders' equipment is about saturated? Is there anything in the account to indicate that the "acceleration principle" operated in this industry during and following the war years? What effect would this have upon the outlook for the Acme-Western Machinery Company?
4. How does the expected decline in the number of builders affect the Acme-Western Machinery Company? Would the situation be any different if, instead of two competitors, the Acme-Western company had a dozen or two competitors?
5. What recommendations would you make as president of the company?

Case VI-6: KELSO HEATING AND SHEET METAL COMPANY, INC.

In the spring of 1941 the Kelso Heating and Sheet Metal Company was experiencing difficulty in obtaining an adequate supply of oil- and gas-burning furnaces and boilers. The company had been operating at capacity for about two years, primarily engaged in the installation of heating systems in new homes. There had also been a marked trend toward the substitution of gas-fired furnaces in place of coal, and the company was also active in this line. In addition, the company had developed a reputation in its region as expert installers of sheet-metal work of all kinds.

The company was established in 1932, as a furnace repair business, by four brothers whose father had long been engaged in the sheet-metal business. In spite of depressed economic conditions, the firm had prospered and grown. It obtained business, to a considerable extent, on a price basis. On sheet-metal work the firm underbid most of the other companies in the area, but its work was of only the best quality. The brothers were willing to sacrifice profit for the sake of obtaining business during the early years of the firm. The business was built upon the theory that the customer must always be satisfied both as to quality of work and as to price charged.

By 1938 the company owned a new building, in which operations were housed. The building was free of encumbrance and had cost $14,000. The company also had a stock of sheet metal and furnaces worth about $35,000, which was paid for. It was the practice of the firm to pay cash upon the receipt and inspection of all materials. All four brothers worked on estimates, performed the actual work with the help of laborers, and, when time permitted, manufactured stove pipe and elbows in their own shop. The pipe and elbow manufacturing operations were the only ones of the kind within a radius of two hundred miles. Both pipe and elbows were sold through jobbers in several states. The balance of the company's operations were primarily local.

During the calender year 1940, the company installed complete heating systems in 527 of approximately 1,100 new homes built in the area. In addition, it installed 381 gas furnaces in place of coal furnaces. This was done with a crew of 21 men in addition to the owners of the business. Some of the electrical work and steamfitting operations were performed on subcontracts to other firms. The company handled a nationally known oil furnace and boiler and two equally well-known gas furnaces and boilers. It also handled conversion units of both kinds. Shipments were received by rail direct from the factories in carload lots. The company had adequate space in its building and carried inventories so that it could keep itself continuously occupied. Toward the end of 1940, however, as defense operations began to get under way throughout the nation, the shipments became less regular. Occasionally, the intervals between shipments were so long that lack of supplies caused the company to have idle time and resulted in upset schedules. This was causing some dissatisfaction with local contractors with whom the company did a great deal of business.

In a near-by city was located a company, the Apex Furnace Manufacturing Company, which had been engaged in the manufacture of coal furnaces for a number of years. It had three models which were produced in different sizes, and all were designed for the use of coal only. The company had enjoyed an excellent reputation as a producer of quality furnaces during the twenties, but since that time its business had continually declined. The best-known furnace of its line was known as the "Heatgenerator" and was made in both a commercial and a residential model. It worked on the hot-air principle and was hand-fired but easily adaptable to stoker firing. It was designed about 1917 and patented a few years later. It was a rather large piece of equipment and was assembled from over 175 parts, but had been rated high by the Anthracite Coal Institute for efficiency. It had not been redesigned since the original patent, and one reason for its decline in use was the expense of maintenance. Because of so many parts, dealers were required to carry a considerable inventory and it required a trained mechanic to take such a furnace apart for repairs and assemble it again. This resulted in high labor costs. Its original cost was somewhat higher than furnaces of similar heating capacity, but its fuel consumption was less. Apparently the high cost of maintenance, together with other factors, caused the downward trend in sales of this model.

A second model produced by the Apex company was exclusively for residential use. It was also designed early in the 1920's and had not been modified since. It was considerably lower in price than the "Heatgenerator" of similar size and was known as the "Airtube." It was much more simply constructed than the "Heatgenerator," in that it was composed of seven castings and a sheet-metal cabinet which sat on top of the castings. This cabinet was filled with a number of tubes through which the exhaust from the firebox passed, and the heat was transmitted to an air chamber and then into ducts. The outside of the furnace was covered with a round sheet-metal jacket which permitted the entrance of cold air at the bottom and upward into the air chamber for reheating. It was designed as a gravity system and usually installed as such. This model was the largest-selling item in the Apex line and was competitively priced.

The third model in the Apex line was a simple cast-iron furnace similar to the "Airtube" except for the air chamber above the firebox. It was the cheapest and least efficient furnace made by the company and was priced to compete with similar furnaces in the market. Like the other two models, it also suffered from lack of improvement in appearance and efficiency.

During the 1920's the Apex company owned its foundry and machine shop and confined itself exclusively to the manufacture and sale of furnaces. It operated primarily in the New England and Middle Atlantic states, although it made some sales in the Great Lakes area. It maintained branches in seventeen of the larger cities in that area at the peak of its operations. It sold through jobbers and retailers. Branch offices carried a large inventory of both furnaces and repair parts in order to maintain prompt and efficient service, although the company performed no service operations itself. The two higher-priced models in its line were well known in the heating business in the territory served and enjoyed an excellent reputation.

During the depression of the thirties, the Apex company lost its foundry through default of bonds and sold its machine shop to avoid foreclosure by creditors. The company managed to retain ownership of its patents and much of its inventory and the patterns from which the castings were made. It reduced its operations to the maintenance of only two branch offices and had its castings made at a foundry in a near-by city on a contract basis. The machining of parts was provided in a similar manner. The company also engaged in direct selling and concentrated its attention more upon replacement business and the sale of parts than on an attempt to obtain new business. In the city in which the company had its home office it even went into the business of installation of new and replacement business. At no time during the thirties did the company attempt to adapt its furnaces to either gas or oil. The president of the company was an elderly person who had difficulty getting along with people. As a result, relations with jobbers and retailers tended to deteriorate.

The Kelso Heating and Sheet Metal Company had installed some of the furnaces of the Apex company in the past and was aware of the decline of the Apex company. The Kelso company learned through its attorney that the Apex company might possibly be purchased if the purchaser would assume the liabilities of the company. Investigation revealed that the company was practically on the verge of bankruptcy. Exhibit 1 shows a condensed balance sheet of the Apex company as of December 31, 1940.

Exhibit 1

THE APEX FURNACE MANUFACTURING COMPANY, INC.

CONDENSED BALANCE SHEET, DECEMBER 31, 1940

Assets:		Liabilities:	
Cash	$ 1,121.23	Accounts payable*	$13,125.71
Accounts receivable	2,276.38	Notes payable	3,611.08
Parts inventory	8,233.94	Accrued taxes†	6,141.29
Furnace inventory	5,123.18	Capital stock	15,000.00
Land and buildings	6,359.45	Surplus	136.10
Goodwill and patents	15,000.00		
Total Assets	$38,014.18	Total Liabilities	$38,014.18

* Includes $4,239.73 due foundry for casting, and foundry has a lien on patterns as security.

† Includes $2,862.41 in social security taxes and income taxes which are past due plus interest and penalties to date.

Arrangements were made with the Apex company for an inspection of its operations and the following was determined:

1. The chief assets of the company are its inventory of parts, patterns (subject to liens by the foundry), its patents upon its furnaces, and some unassessable amount of good will.

2. The "Heatgenerator" model is unsuitable for the present market without considerable redesign, but the outcome of even such attempts is quite uncertain. It is completely out of date and should be continued only to take care of old customers who are unwilling to accept a substitute. Profit from this model has come primarily from the sale of parts rather than the sale of the furnace. Considerable research expense is necessary on this model.

3. The "Airtube" model furnishes an excellent opportunity for adaptation to either gas or oil fuels with a minimum of expense. It could be easily adapted to a boiler by appropriate modification of the castings. A slight change in the firebox and redesign of the outer jacket would give this furnace a modern and streamlined appearance. The air chamber above the firebox is easily adapted to either forced warm-air circulation or air conditioning. The redesign of the patterns for casting the firebox would cost approximately $5,000. New patterns would be required to convert it to a boiler, at a cost of approximately $8,500. The new outer jacket could be made in the plant of the Kelso company from sheet metal and painted any desired color by spray equipment. Stokers could be easily adapted to this model also, at low cost.

4. The cheap model in the line could be carried in its present state by the Kelso company to meet whatever demand the company may have for a standard hand-fired coal furnace. Some streamlining of its appearance and the adaptation of a forced-air mechanism would perhaps help this model.

5. The chief problem presented is the capacity of the Apex company, even in its present state, in relation to the demand of the Kelso company. Currently, the Kelso company sells about 900 to 1,000 furnaces per year. By continued use of the contracting of foundry and machinery operations the Apex company has a capacity of about 7,500 to 8,500 furnaces per year. At this level of operations the Kelso company could enjoy a profit margin of about 55 to 60 per cent on the sale of furnaces, compared to its present 25 per cent. The present distribution system of the Apex company disposes of only 1,500 to 1,800 furnaces per year. To dispose of capacity output of the Apex company would necessitate the building of new outlets and a decision as to whether sales should be handled by company salesmen or through agents and distributors. If the Kelso company acquired the Apex company at this time and made no attempt to produce more than its own needs, the profit margin per furnace would be about 8 to 10 per cent but would assure the Kelso company of a steady supply of furnaces. This margin is computed on the basis of the modifications suggested above and the purchase of oil and gas burners from outside sources, since neither the Apex nor the Kelso company is currently set up to produce them. In short, the acquisition of the Apex company would mean moving into a larger and wider market for the Kelso company. The Kelso company had never had experience in handling a sales force.

6. In addition to the foregoing, there is the problem of maintenance of demand of the Kelso company at the present level. A large share of the company's present sales is dependent upon the construction of new houses. A decline in this area would force the company to increase its efforts to sell more furnaces in a wider market. If the decline in building were widespread, this problem would become acute.

The owners of the Apex company asked $50,000 for the business, the purchaser to assume all liabilities. The attorney for the Kelso company believed that an offer of $10,000 would be accepted. Working capital of approximately $50,000 cash would be required immediately to handle an output of 4,000 to 5,000 furnaces during the first year of operations by a new owner. Additional personnel would be required to handle both production and sales of the Apex company in the event of purchase.

The Kelso company had approximately $40,000 cash on hand, plus excellent credit standing at all local banks.

QUESTION

1. Would you recommend that the Kelso company purchase the Apex company?

Part VII

WAGE POLICY OF THE INDIVIDUAL FIRM

THE FORMULATION of the wage policies of the individual firm is a rather complicated process. Quite obviously, the problem varies according to the size of the firm and its importance in the industry, as well as with the industry itself. The wage policies in the so-called "basic" industries, such as steel, transportation, metals, etc., not only are complex within themselves but have far-reaching effects upon the wage and price policies of other industries. A small firm does not always have the simplest problems in matters of wage policy, nor does a large firm always face the most complex of wage problems. All firms, however, are concerned with probable future events as well as present conditions, both of which are important in the determination of wage policy. The forecast of probable future events includes the expected behavior of trade unions as well as an estimate of the movement of other economic variables.

The discussion which follows will not be an attempt to cover all aspects of labor relations of the firm. We are concerned here mainly with the economic properties of labor contracts. To the businessman a wage is a cost, and as such it enters into his calculation of plans for the future. A change in the wage rate is a change in cost. Changes in the cost structure of the firm in turn, affect, in various degrees, price policy, production plans, marketing plans, and many other economic relationships. With the growth of trade unions in recent years, costs are affected by more than wage rates alone. Welfare benefits, installation of safety equipment, pension plans, changes in length of the working week and day, and similar modifications affect the costs of the firm. We are interested, primarily, in the effects of these changes upon costs, both actual and potential, and upon the over-all policies of the firm. Some of the conditions and situations which affect the wage policy of the firm will be discussed below, but the list is by no means exhaustive. While these situations provide some broad principles, it cannot be overemphasized that they do not provide a formula for wage policy for all firms under all conditions.

The Going Wage Rate

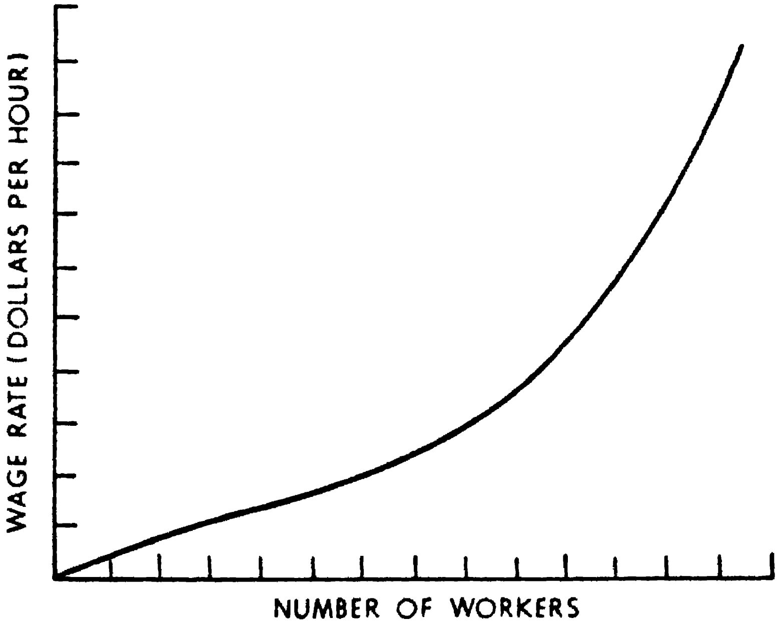
Among many businessmen there is the tendency to pay the "going wage rate" for the various skills of labor demanded. If such a policy is followed exclusively, the wage policy of the firm is indeed a simple one. What this means is that the firm has little, if any, control over the level of wage rates. It may also be the result of custom or tradition in the industry to pay the going rate. But this does not explain how the going wage rate is determined. This rate may be, and probably is, the result of several causes. If the community in which the firm is located is one not dominated by any particular industry or a firm substantially larger than any of the others, the wage rate is probably the result of competitive bidding by the various firms for the available supply. This situation is analogous to the condition of pure competition in the pricing of a standard product where there is a large number of buyers and sellers so that no particular seller or buyer affects the price determined in the market. By "supply of labor," in this case, is meant the supply of the various skills. In such a condition an increase in the demand for a particular skill would, other things being equal, occasion an increase in the wage rate for that skill. If the increased demand originated in one particular firm, there would be a tendency for all firms to meet the higher offer in order to retain their employees. Competitive conditions in the labor market tend to determine the wage rate. The going wage rate is the result of the aggregate demand of all the firms relative to the supply of labor.

Where labor is not organized, the supply of labor may be shown graphically as in Exhibit 1. The shape of this curve depends upon the conditions of supply. If there are large numbers of workers willing to sell their services at a given rate, the curve will tend to be flatter than in the case of few workers willing to work at the same rate. That is, the greater the number at the given rate, the more elastic the curve; and the fewer the number, the less elastic the curve. The elasticity of this curve is not controlled entirely by the local labor supply. The local supply may be increased or decreased if differentials between the local wage rate and the rate of other communities are sufficient to induce workers to move from one community to another.

The going wage rate may also be the result of leadership of a particular firm or industry in the community. If there is domination of the demand for labor by a particular buyer of labor services, the rate he is willing to pay may set the "pattern" of wage rates in the entire community for the skills this buyer demands. This rate may be higher or lower than would exist in a more competitive market, depending upon conditions of supply. Smaller firms must pay the equivalent rate in order to obtain workers.

Exhibit 1

SUPPLY CURVE OF LABOR IN AN UNORGANIZED MARKET



There is, however, a possibility of departing from the going rate. If the supply of labor is such that the leading firm cannot hire the entire supply, the remainder may be forced to seek employment at a lower rate. This raises the possibility of obtaining labor of lower quality, particularly if the leading firm has a conscious policy of taking only the highest-quality labor obtainable. If a firm competing for labor services wishes to maintain the quality of its labor, it may be forced to pay the going rate. A firm, however, which can utilize the lower-quality labor may be able to offer a lower wage and obtain a sufficient quantity of labor. This is one of the reasons why there may be differences in wage rates within the same community, both within and without the same industry.

Where all industries in a given community draw upon the same labor supply, the going rate may be determined by the largest users of labor, and the wage policies of other buyers of labor will be patterned after those of the larger firms. Where such a condition of leadership exists, other firms are concerned not only with meeting the going rate but with seriously considering whether they should offer more than the going rate. To do the latter may have unfavorable long-run consequences, in that the going rate may be affected by such action and incur the ill will of other buyers of labor. In a situation in which there is a tendency to pay going wage rates determined by firms who compete directly in the product market, a move on the part of one of the competing firms to raise the wage rate may bring about retaliation in the form of more severe price and service competition in the sale of products. This situation also suggests that an increase in wage costs may not always be passed on to the consumer in the form of a price increase. Competitive conditions may limit such action.

Wage Rates, Prices, and Costs

Price trends apparently have considerable influence upon wage policy. In the recovery and prosperity periods of the business cycle, rising prices usually prevail. Rising prices, in such periods, are frequently accompanied by a shift of the demand curve upward and to the right, indicating that consumers of various goods and services are willing to pay a higher price for the same or a larger quantity of the product. Under such conditions businessmen are more willing to pay higher wages if the occasion arises. In many cases it is necessary to offer higher wages during such periods in order to maintain an adequate supply of labor. Union demands for wage rate increases can also be met more easily if the price movement is upward, so far as a single firm is concerned.

But why the apparent necessity to raise prices because of wage increases? Or, to ask the question in another manner, why does price policy play such an important role in wage policy? In the long run, wage increases are possible because of increases in labor productivity, but increases in productivity occur rather slowly. It has been estimated, for example, that the average annual increase in productivity in the United States is about 3 per cent each year. Wage demands, on the other hand, are usually for a much greater amount. Therefore, in order to meet increased wage costs, the businessman is faced with the problem of offsetting them in another area if possible, especially if the increase involves him in short-run losses or a rate of return on investment so low as not to warrant continued operations. Price policy assumes great importance in such a case. Price policy depends, to a considerable extent, upon elasticity of demand and shifting of the demand curve. A firm may follow a price policy based upon a customary or traditional mark-up over and above total unit cost only so long as the demand for the product is highly inelastic or the curve shifts to the right sufficiently to prevent a decline in volume sold. This is because the determination of total unit cost is based upon some level or range of volume of output and any serious modification of this volume may result in losses on total operations. In other words, price and/or income elasticity[1] of demand for the product must be such that the increase in price causes no appreciable reduction in sales. Unfortunately, all firms do not enjoy such ideal conditions of demand. In some cases price elasticity of demand may permit the businessman partially to pass on some of the increased wage cost, while in other cases price elasticity may be such that no increase in price is possible without a serious decline in sales. Many firms sell in a market in which they do not have such control over their prices; hence the adjustments must take place in other areas. Either the increased wage costs must be absorbed out of profits, or costs must be reduced in order to maintain or improve the profit position.

Since not all costs of business operations are labor costs, some possibilities may exist for reducing total costs in spite of an increase in wage rates. Such a modification of costs, however, is usually not a short-run proposition. Future costs enter into the wage policy of the firm. As a result of higher wage rates, increased mechanization of production—that is, an increase in productivity—may provide a long-run solution. This will probably involve increased output and hence introduces the problem of expanding the market for the product. Both horizontal and vertical integration, i.e., the acquisition of competing firms and/or marketing outlets, have been used by some firms to expand their market in order to secure economies of production. It is even possible that a price reduction may provide a sufficient increase in sales so as to utilize the greater capacity which increased mechanization would bring about. But here, again, the competitive situation of the firm may restrict complete exploitation of price adjustments to offset wage increases.

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[1] Price and income elasticity are discussed in Part II, pp. 58–60, 68–70.

In the recession and depression periods of the business cycle, wage policy becomes especially important. Wage rates, in the absence of union resistance, are one of the costs of production over which the firm has greater control. When prices are declining, one of the most effective ways of reducing costs is a reduction in wage rates. Again, the low rate of increased productivity relative to the decline in prices is one of the major causes for immediate reduction of wage rates. There is a great deal of dispute as to whether productivity increases more or less rapidly in periods of depression compared to prosperity. We do not intend to argue the point here but rather to point out that a failure of productivity to increase at a rate proportionate to a decline in prices increases the pressure to reduce wage rates as a method of cost reduction.

Price policy also becomes important in this phase of the business cycle. Where the demand curve of the firm is inelastic downward, there is little reason for reducing prices, and, at first glance, this may appear as an argument against a wage rate reduction. In this case, however, it is the shifting of the demand curve which is important, and, if the shift is to the left, a reduction of the wage rate may offer the only opportunity of reducing costs. As the level of output declines, fixed unit cost tends to increase, and this, together with a maintenance of the wage rate, will cause total unit cost to rise, assuming other costs than wages remain the same. Hence a reduction in the wage rate to offset, wholly or partially, the rise in fixed unit cost offers a possibility of offsetting the rise in unit cost with a decline in output. Otherwise, with an inelastic demand curve which is shifting to the left, a price rise may be in order. This is the theory apparently followed by the public utilities in some instances, such as the railroads, who occasionally petition the Interstate Commerce Commission to grant a freight rate increase to offset rising costs due to declining traffic.

There is also the case of the firm whose product demand curve is elastic, which means that a price increase will result in considerable decline in sales and thus output. Should a rise in wages occur under such conditions, the firm may find it profitable to increase price and curtail production, especially if the curve tends to become less elastic at higher price levels. The result will be higher unit cost, but, if the price is sufficiently high to cover this higher cost, the firm may find it more profitable to operate at lower levels of output. There will be a higher wage rate in effect, but fewer workers employed.

Where the firm is unable to exert any appreciable price control over its product, a modification of the wage rate focuses attention upon long-run considerations. If the increase in the wage rate cannot be passed on either in the form of price adjustments of products or backward to suppliers of materials and services in the short run, so that the results are operations at a loss, the businessman must consider adjustments in the methods of production. If the firm has sufficient capital and there is a possibility of revising the organization or productive methods of the company so as to make possible profitable operations, it may be good policy to pay the increased rate in the short run rather than close down or liquidate. The nature of such long-run adjustments may be a change in the production or marketing organization, a modification in the quality of the product, or possibly integration with another firm in order to enjoy a larger market which would permit a higher volume of production in order to lower unit costs.

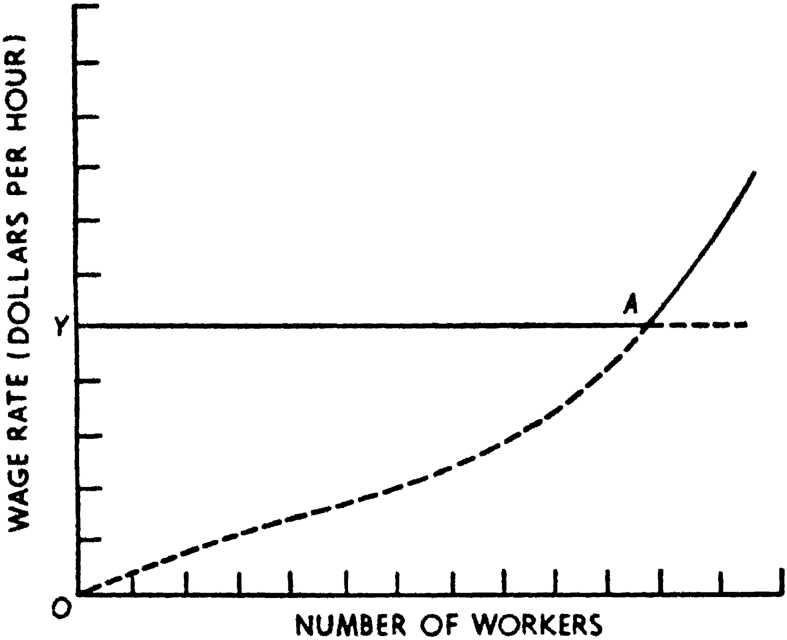
Labor Unions and Wages

With the growth of organized labor in the past two decades, many firms no longer enjoy as high a degree of control over the wage rate as formerly. The organization of labor into trade unions affects the conditions of supply of labor. The shape of the supply curve of labor tends to appear as in Exhibit 2. Since workers are unwilling to supply their services at any rate less than the rate demanded, that part of the curve shown as a dotted line has no meaning. No labor is forthcoming at any rate below *OY*. Within the limits described by the horizontal part of the curve, *YA*, the wage rate will remain the same for any amount of labor demanded. This raises some problems for the businessman, particularly in times of falling prices. To the extent that the union is unwilling to accept wage rate reductions, the businessman has lost control over the wage rate. This element of cost becomes more rigid, so that cost reduction in this area is largely ruled out. Even in periods of rising prices, the demands of trade unions for wage rate increases may pose a similar problem if the price increases occur relatively slowly compared to the wage demands.

In the case of firms who are extremely large buyers of labor in a given market, the firm is no longer able to post the wage rate it is willing to pay and expect to obtain an adequate supply of labor. Where this posted rate is less than the amount the union is willing to accept, no labor will be forthcoming, and, if operations are to be carried on, the union will exert some control over the level of the wage rate. This does not mean that the firm surrenders all control over the wage rate but that the limits within which it is free to set wage rates are restricted. A labor union with a very militant attitude will probably exert greater influence upon the rate than one less so. It is only where the firm is willing to pay a rate acceptable to the union that an adequate supply of labor will be obtainable.

Exhibit 2

SUPPLY CURVE OF LABOR IN AN ORGANIZED MARKET



More aggressive labor unions exert influence not only upon wage rates but also upon so-called "fringe benefits," such as sickness and accident insurance and treatment, safety provisions, rest periods, cafeterias, pensions, and others. These additional benefits also affect the costs of the firm and are a component of the total wage which the firm is able and willing to pay. They are not, however, always easy to define in terms of unit cost, as some items, such as medical care, may be of a fixed nature—for instance, the maintenance of a dispensary in a large factory. Labor contract negotiations concerning pensions raise problems of cost which can be defined precisely only under some rather strict assumptions, as, for example, the average annual volume of production over a long period, long-run behavior of prices, expectations of technological progress in the industry, effects of general economic fluctuations, rate of labor turnover, and many others. In order to reach agreement upon pensions today, such long-run considerations must be assigned some weight and value which is an estimate and subject to error; yet the decision cannot be postponed because of the lack of perfect knowledge. In the basic industries these decisions are of paramount importance, since they ordinarily project an image of agreements in allied and other industries. In the illustration used earlier in which the wage policy of the firm is based upon the policy of the leader in the industry or chief competitor, not only is the level of wages patterned after that of the leader, but the labor contract itself, as concerns these additional benefits, is similarly patterned. Similar results tend to accrue as regards these benefits in the other situations discussed.

Arguments of Labor Unions

Many arguments are presented by labor unions to support a demand for a wage rate increase. Among these are the cost of living, the ability of the firm to pay, differentials as among firms in the industry, increased productivity and price policies of the firm. Since the widespread organized labor movement in the United States is not far removed from infancy, its policies are not fully matured. Frequently the businessman is puzzled by the demands of the labor union associated with his firm. A demand for a wage increase may be actually but a smoke screen for some unnamed demand or perhaps a wedge for concessions by the firm in another area of labor relations. Labor leaders are under pressure from within their own unions and also from competition of other unions to obtain concessions from employers. Rivalry among leaders of unions also influences some of the demands made upon employers. As a result, demands may be made upon the firm which, in the initial instance, are not the real demands or fundamental objectives of the union at all.

Allegations were made during the steel strike in the fall of 1949 that the real demand was not the issue of pensions but rather an attempt to establish industry-wide bargaining in the steel industry.

Within the past decade one of the most popular reasons for seeking a wage rate increase has been the cost of living. With rising prices of consumer goods it is argued that the worker requires more income to maintain his standard of living and hence his wages should be increased to offset this decline in purchasing power. This argument may obtain popular support for the union and strengthen the loyalty of members to their union, but it cannot be the ultimate guide to the wage policy of the firm. While the Department of Labor publishes periodical indexes of the cost of living, the data are not always applicable to all cases. The indexes are based on some specific assumptions and hence are limited in use. They are perhaps more in the nature of indicators of the direction in which the cost of living is moving rather than an absolute measure. There is also the question of the correct base year upon which a comparison may be made. In some cases one base year will show that wages have risen more than prices, while in other instances the same data with a different base year will produce opposite results. The real issue to the businessman is not the problem of whether his wage rate is commensurate with the cost of living but whether the price of labor, together with other components of total cost, will permit him to produce and sell his products at a price which will enable him to earn a profit sufficient to warrant the continued existence of his firm. If conditions of demand for the firm are such that the price received for each unit will not cover all costs, including a wage rate consistent with the cost of living, either currently or in the future, the wage demand cannot be met. Under such conditions a firm must either cease operations or obtain a more favorable rate for wages. While it may be socially desirable for firms to pay a wage consistent with the cost of living, conditions of demand and cost may render such a wage rate uneconomical.

Frequently the ability of the firm to pay is cited as a reason for granting a wage increase. Usually this refers to the profit position of the firm. Many unions, in their demands for higher wages, cite the profits of the company for a given period as evidence of ability to pay. They further argue that the firm may not only grant a wage increase but also refrain from increasing prices because of its favorable profit position. While this may be mathematically true for a given period in the past, it does not necessarily hold true for the future. Expected future profits are the chief consideration of the businessman in calculating his commitments for the coming fiscal period. As pointed out in Part I, profits are very volatile in nature, and the businessman hesitates to commit himself to higher costs as against revenue of such an uncertain nature. In addition, there is always the problem of definition of profits. The union does not always consider such items as reserves for inventory revaluation a legitimate deduction from revenue for the purpose of determining profits. There is also the argument of management that a certain portion of profits must be retained for expansion and research, which is occasionally questioned by the union. Management may argue that the union contracted to work for an agreed rate during the past period and that profits which were earned on that basis belong to the stockholders and the union has no claim against them. Seldom is such a position accepted by the union. The argument of the ability of the firm to pay is, in many respects, a confusion of past performance of the firm with expected future performance. From the standpoint of maximizing profit, future earnings are more appropriate for consideration in a wage dispute than are past profits.

The argument of unions that a wage rate increase is necessary to eliminate wage differentials for similar skills within the industry is frequently set forth. This is somewhat in the nature of industry-wide bargaining except that it is attempted on a company-by-company basis. There is no logical reason why the wage rate should be the same in every firm in an industry. Conditions of supply of labor vary from one locality to another. There is also a diversity of other economic factors as among various communities which tends to make the cost structures of the firms in these respective locations vary. This argument is inconsistent with the cost-of-living theory, since the elimination of differentials in wage rates in an industry gives workers in some localities higher real wages than others because of regional differences in cost of living. The elimination of differentials between firms in the same industry in the same locality is more logical, although, as pointed out above, conditions surrounding the supply and demand for labor may also point toward differentials for the same skills in the same community. Trade unions sometimes take the position that in the same locality the wage rate for a given skill should be the same in all industries. While this is the result to be expected from the operation of a purely competitive market for labor, imperfections in the market permit differentials to exist.

Increased productivity is perhaps most used when some of the above arguments appear weak. An increase in output per man-hour is the basis of this argument. Such an increase may arise from increased dexterity of the worker or greater concentration of worker effort, but more often it results from increased capital investment by the firm. The installation of machinery which permits the same or a smaller number of workers to turn out a greater number of units of product than before, without an increase in the wage rate or a decline in the unit price of the product, brings forth greater profit per unit. While it is true that the worker does produce a greater quantity, the problem of measurement enters here, since some of the increased output is due to the machine itself as well as to the worker. In the absence of price changes or modification in the amount sold by the firm, increased productivity does improve the "ability of the firm to pay" (nebulous though the meaning of that phrase may be). Particularly might this be true in the case of a firm engaged in oligopolistic competition with a highly standardized product. Suppose such a firm, through the installation of new machinery, achieves a substantial reduction in total cost per unit. Because of its competitive situation, there would be little pressure to pass on this reduced cost in the form of lower prices, as profits would be greater to continue present prices. In this case the labor union in this firm may attempt to capture part of this gain by demands for higher wages. If the "ability to pay" argument were advanced by the union, it would place the management group in a defensive position. But again in this instance, as in all others, management must balance the cost of the wage rate increase against expectations of revenues in determining the position it may take in reply to such a demand.

Industry-Wide Bargaining

Bargaining by labor unions on an industry-wide basis seriously affects the labor policy of many firms. It tends to equalize wages for the entire industry regardless of the cost structure of the firms in that industry. The outstanding examples of industry-wide bargaining in the United States today are in the coal and railroad industries. Bargaining takes place between representatives of the unions and representatives of the firms in the industry. Industry-wide bargaining may be achieved in effect where there is a strong and militant union in an industry in which there are relatively few firms or in which there are a few large firms so that competitive conditions of leadership strongly influence the wage policy of the remaining firms. In such a case, wage agreements are drawn with the larger firms in the industry, and union pressure is put upon the remaining firms to fall in line.

Advantages of industry-wide bargaining vary with the individual firm. Firms which are small and have little or no representation on the employers' bargaining committee have no voice in the determination of the wage rate. The high-cost or marginal firm is unable to lay its special conditions before the union. Where large and more efficient firms dominate the employers' bargaining committee, there may arise the suspicion that these larger firms may favor a wage rate higher than the marginal firm can pay, in order to eliminate competition On the other hand, if the firms who dominate the employers' bargaining committee are the high-cost firms, it may bring about a wage rate lower than would obtain under a system of bargaining with the individual firms. Industry-wide bargaining destroys the control over the wage rate of firms in different locations and, to some extent, in same localities. Once an agreement is reached, the firm can do no more, so far as the wage rate is concerned, than treat it as a cost over which they have no control other than the influence any given firm can exert through the representatives of the employers at the bargaining table. When the wage rate is fixed in such a manner, the businessman is forced to seek adjustments through price policy to the extent he is able or, in the long-run, through possible changes in the over-all cost structure of his firm. Failing that, he must be content with a lower margin of profit or cease operations entirely.

In any event, in judging demands for wage rate changes, the businessman must determine in the final instance whether the amount and quality of labor supplied to him is worth the price demanded. This involves both short- and long-run considerations. Each firm must weigh the economic variables with which it deals and make its own calculations. Wage policy applicable under one set of conditions is not always the proper solution in a different situation. Evaluation of all elements in each case is essential to a sound solution.

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Case VII-1: C. C. WOODLEY (II)

In September, 1929, Mr. C. C. Woodley was awarded the contract to transport the mails between the main post office and the railroad stations and between the main post office and substation post offices in a large city in northern New York. This contract covered the period from January 1, 1930, to December 31, 1933. These contracts were awarded on the basis of sealed bids, which were submitted under conditions prescribed by the Post Office Department. Under the terms of the contract the contractor agreed to provide all equipment, personnel, and supplies necessary to render the required service. Equipment complied with specifications as to size, weight, and color of trucks and provisions for safety of the mails. Personnel was bonded and made available to meet whatever schedule local conditions demanded. For this service Mr. Woodley received $28,550 per year. In September, 1933, Mr. Woodley was again awarded the contract for another four-year period ending December 31, 1937, for an annual payment of $27,200. Under the terms of the contract, the contractor would be compensated, on a pro rata basis, for any service demanded above that outlined in the contract.

In July, 1937, Mr. Woodley prepared estimates preliminary to submitting a sealed bid for the renewal of his contract, which expired on December 31, 1937. Although the terms of the proposed contract were almost identical to those of the existing contract, several factors had changed to the extent that they had to be reconsidered. The most important of these factors was wages. Mr. Woodley was not experiencing any current labor difficulties, but the occurrence of several events prompted a survey of the future labor picture.

For several years Mr. Woodley had been aware of the increasing organization of labor in his city, and particularly clear in his memory was a violent strike in relation to the organization of the steel workers by the Steel Workers Organizing Committee at a local plant of the United States Steel Corporation. His own employees were not organized. Early in 1937 a moderately successful drive had been made to organize the drivers of the larger cross-country trucking lines, and there had been some reports in the local papers of proposals of the local unit of the Teamsters Union to organize local truck drivers. Up to that time no definite steps had been taken in this direction. Since the passage of the National Labor Relations Act in July, 1935, there had been an increased tempo in the organization of labor. Mr. Woodley also noted that with each successful organization of a group of workers a rise in wages usually followed, in spite of the fact that there were currently about 17,000 unemployed persons in his city in June, 1937.

In September, 1936, Mr. Woodley had purchased three five-ton trucks which he used to operate an intercity freight trucking business. These operations were kept separate from those of the transportation of the mails, although he occasionally used one of his intercity drivers to drive a mail truck when he was not otherwise occupied. A proper charge was made against the mail contract whenever a freight driver was used. The three trucks used in the freight business were kept and serviced in the same garage with the mail trucks. Drivers of the freight trucks were organized, and their wages were $40 per week on a straight-time basis. The use of a higher-paid freight driver had caused dissatisfaction among the regular mail drivers on a few occasions.

Mr. Woodley had learned that a Mr. Connally, as well as several others, proposed to submit bids for the contract beginning January 1, 1938. Mr. Connally had submitted a bid in 1933, which was $10 less than that of Mr. Woodley. It was the policy of the Post Office Department to accept the lowest bid unless there were good reasons for doing otherwise. Owing to the small difference in amounts and the problems accompanying the breaking-in of a new contractor, Mr. Woodley was awarded the contract in 1933. In July, 1937, Mr. Woodley was considering a voluntary increase in wages for his mail drivers and the submission of a bid to cover the increased wages. The fact that Mr. Connally intended to submit a bid at this time, however, led him to fear a loss of the contract if such action were taken. Mr. Woodley had shown a net profit in his statements of mail contract operations of $6,317, $5,938, $6,035, and $5,123 for the years 1933, 1934, 1935, and 1936, respectively.

When Mr. Woodley began service on January 1, 1930, he retained several drivers employed by the preceding contractor and paid them the going rate of $25 per week for full-time drivers and 35 cents per hour for part-time drivers. No change was made in this rate following the economic collapse of 1929 and the subsequent sharp decline in prices, wages, and employment. He had given serious thought, however, to a reduction in wages in 1932, when the prevailing rate for truck drivers in the city was about $15 per week. Such a reduction would have increased his profits considerably, but he decided against such a move. From 1929 to 1932, his labor turnover declined considerably, and so did his accident rate. By 1937 there had been some recovery in the price level and wage rates, but the prevailing rate for drivers was still somewhat under that paid by Mr. Woodley, but until this time he had given no further thought to a revision of his wage rates. He believed, however, that, if the upward movement continued, a revision of his wage rate would be necessary.

In September, 1937, he submitted a bid in the amount of $29,300, and was declared the successful bidder. In May, 1938, he voluntarily increased the wages of his drivers from $25 to $30 per week and adjusted the hourly rate accordingly. There was no pressure directly from his drivers, although they had joined the local unit of the Teamsters Union in December, 1937. In 1936, the twelve-hour shift had been reduced to an eight-hour shift. This had been accomplished voluntarily when a rearrangement of railroad schedules made it possible to use only one driver between the hours of 12:30 A.M.

and 5:00 A.M. Such a shift had increased the use of part-time drivers, but the increased expense had been nominal.

In July, 1938, the business agent of the local Teamsters Union approached Mr. Woodley with a demand that he increase the weekly rate of his regular drivers to $40. Mr. Woodley replied that he could not afford to pay this increased rate and refused to meet the demand. Shortly thereafter, he was informed by mail, over the signature of the business agent, that unless the demands were met Mr. Woodley's drivers would go on strike fifteen days from the date of the letter. There was a rapid increase in wage rates in the city, but the changes were so frequent that Mr. Woodley was not aware of the exact amount of the going wage rate for truck drivers. He discovered there were sharp differentials throughout the city but believed that the going rate was substantially higher than in 1937.

On July 1, 1938, Mr. Woodley had in his employ five full-time drivers who worked an eight-hour shift within ten hours, and nine part-time drivers who were employed an average of six hours per day. One of the part-time drivers also served as garageman and mechanic, which, in effect, made him a full-time employee.

QUESTIONS

1. Should Mr. Woodley grant the wage demand in July, 1938?
2. Should he have reduced wages in 1932?
3. Do you think Mr. Woodley was wise to increase wages voluntarily in May 1938?
4. What is the relationship between Mr. Woodley's "ability to pay" and the demands made by the business agent of the Teamsters Union.
5. Suppose that Mr. Woodley's intercity freight operations produced a net profit of $5,000 per year. Would this affect the amount of the bid Mr. Woodley submitted in September, 1937? Would it affect his "ability to pay" in the case of his mail contract? How?

Case VII-2: THE CHICAGO TRANSIT AUTHORITY

The Chicago Transit Authority, a municipal corporation, was created by an Act of the General Assembly of Illinois known as the Metropolitan Transit Authority Act approved April 12, 1945, and adopted by the electors of Chicago at a referendum election on June 4, 1945. The corporation was created for the purpose of improving and extending local transit facilities and service in the metropolitan area of Cook County by acquiring, owning, modernizing, and operating as one unified system the major local transportation properties within the area.

At a bankruptcy sale on April 22, 1947, the Chicago Transit Authority purchased the properties of the Chicago Surface Lines and the Chicago Rapid Transit Company. To finance the acquisition of the properties the Chicago Transit Authority was authorized to issue $105,000,000 in revenue bonds. The proceeds of this issue covered a purchase price of $75,000,000.00 for the Chicago Surface Lines, $12,162,500 for the Chicago Rapid Transit Company, $3,000,000 for working capital, and $14,837,500 for necessary cash adjustments at the time of transfer of properties and for payment of cost of extending and improving the system and for acquiring any other existing or new property and equipment useful for that purpose.

The bonds were secured by revenues of the Chicago Transit Authority. Accordingly, a trust agreement was made with the First National Bank of Chicago, as Trustee, to provide for payment of interest and principal of these bonds from current revenues. Under the provisions of the Trust Agreement the revenue of the Chicago Transit Authority was to be allocated in the following order of precedence:

1. Working Cash Account. This account is to provide for (*a*) a Damage Reserve Account covering contingencies from operations, (*b*) payments for pensions and retirements, and (*c*) all other costs and expenses and operation and maintenance of the transportation system as provided by the Trust Agreement.
2. Set aside in a special fund designated as the "Series of 1947 Interest Fund," in equal monthly installments, amounts sufficient to pay the next succeeding semiannual installment of interest falling due on all Series of 1947 Bonds outstanding hereunder.
3. Set aside in a separate fund designated as the "Series of 1947 Serial Bond Maturity Fund," in equal monthly installments beginning July 1, 1952, amounts sufficient to pay at the next succeeding maturity date the Series of 1947 Bonds maturing other than on July 1, 1978.
4. Set aside in a separate fund designated as the "Series of 1947 Sinking Fund," equal monthly installments to provide for the purchase of Series 1947 Bonds in the open market or by invitation to tender.
5. Set aside in a separate fund designated as the "Series of 1947 Revenue Bond Reserve Fund," the sum of $107,000 each month until there has been accumulated in said separate fund the sum of $6,400,000. Whenever there are insufficient funds in the "Series of 1947 Interest Fund" the Trustee shall transfer from the "Series of

1947 Bond Reserve Fund" sufficient funds to meet the interest payments due and payable.

6. Set aside, monthly, in a separate fund designated "Depreciation Reserve Fund," an amount of money adequate to provide for estimated depreciation or obsolescence or the transportation system for the preceding month not offset by current expenditures for maintenance.
7. To the extent that the Board may deem advisable or desirable, the Trustee shall deposit from time to time in a separate fund designated as "Operating Expense Reserve Fund." If, in any month, the operations of the Authority should result in a net loss of such an amount that after adding back an amount equal to the provision for depreciation for such month there is still a deficit, then, upon order of the Board the Trustee shall authorize payment to the Authority from this fund to the extent that moneys are available in this fund, in an amount equal to such deficit.

Exhibit 1

CHICAGO TRANSIT AUTHORITY ADULT FARE
CHANGES FOR DATES SHOWN

Date	Surface System		Rapid Transit Company	
	From	To	From	To
October 1, 1947	9¢	10¢	10¢	12¢
May 11, 1948	10¢	11¢	12¢	13¢
June 20, 1948	11¢	13¢	13¢	15¢

Exhibit 2

CHICAGO TRANSIT AUTHORITY
TOP TRAINMAN'S BASIC HOURLY WAGE RATES
OCTOBER 1, 1947 TO DECEMBER 1, 1948

Effective Date	Surface System		Rapid Transit System
	Motormen and Conductors	One-Man Car and Bus Operator	Motormen
May 25, 1947	$1.32	$1.42	$1.331
June 1, 1948	1.43	1.53	1.441
December 1, 1948	1.45	1.55	1.461

8. Set aside from time to time as the Board may designate in a separate fund designated as the "Municipal Compensation Fund" such amounts as the Board may order from time to time. On written orders of the Board such moneys may be used as compensation for the use of streets, tunnels, subways, tracks, alleys, public ways and public grounds.

Exhibit 3

CHICAGO TRANSIT AUTHORITY
CONDENSED INCOME STATEMENT AND REVENUE PASSENGERS BY MONTHS
OCTOBER 1947 TO APRIL 1, 1949

	October 1947	November 1947	December 1947	January 1948	February 1948	March 1948	April 1948	May 1948	June 1948
Operating Revenues	$ 9,236,971	8,558,040	9,200,427	8,857,915	8,310,834	9,111,657	8,689,512	9,059,997	9,696,521
Operating and Maintenance Expenses	8,458,527	8,147,826	8,617,344	8,614,521	8,023,435	8,733,804	8,161,602	8,171,503	8,774,864
Debt Service Requirements									
Interest Charges	317,605	317,605	317,605	318,754	318,038	318,038	318,038	318,038	318,038
Deposits to Series of 1947 Bond Reserve									
Balance Before Depreciation	461,382	92,609	265,478	75,360ᵈ	30,639ᵈ	59,815	209,872	570,456	603,619
Provision for Depreciation Current Period	433,333	433,333	433,333	433,333	433,333	433,333	433,333		433,334
Balance Available (a) to cover deficiencies to deposits in Depreciation Reserve Fund; (b) for Reserves for Operating Expense and Municipal Compensation and (c) for Modernization	27,509	340,724ᵈ	167,855ᵈ	508,693ᵈ	463,972ᵈ	373,518ᵈ	223,461ᵈ	137,123	170,285
Revenue Passengers	92,506,611	85,851,532	92,058,040	88,808,357	83,583,941	91,848,656	87,529,579	85,753,731	83,871,010

	July 1948	August 1948	September 1948	October 1948	November 1948	December 1948	January 1949	February 1949	March 1949
Operating Revenues	$10,138,869	10,083,156	10,096,734	10,583,602	10,253,292	10,766,567	10,107,268	9,328,547	10,279,080
Operating and Maintenance Expenses	8,345,373	8,212,199	8,713,931	9,020,788	8,884,693	9,413,913	9,330,242	8,640,909	9,314,669
Debt Service Requirements									
Interest Charges	318,003	318,003	318,004	318,003	318,003	318,003	318,038	318,038	318,038
Deposits to Series of 1947 Bond Reserve			107,000	107,000	107,000	107,000	107,000	107,000	107,000
Balance Before Depreciation	1,475,493	1,552,954	957,799	1,137,811	943,596	927,651	351,988	262,600	539,373
Provision for Depreciation—Current Period	466,667	466,666	466,667	466,667	466,667	466,667	541,666	541,666	541,667
Balance Available (a) to cover deficiencies to deposits in Depreciation Reserve Fund (b) for Reserves for Operating Expense and Municipal Compensation; and (c) for Modernization	1,008,826	1,086,288	491,132	671,144	476,929	460,984	189,678*	279,066*	2,294*
Revenue Passengers	78,357,564	77,842,845	78,800,708	82,908,394	80,563,860	84,297,402	79,773,972	73,703,916	81,122,767

* Deficit.

9. Deposit in trust at least semiannually, funds not set aside in accordance with paragraphs 1 to 8, above, in an account designated as the "Modernization Fund."

On October 1, 1947, the Chicago Transit Authority began actual operation of the combined transportation systems. In accordance with its authority to fix and maintain rates, fares, and charges adequate to provide revenues for operation and debt service, the Authority, on that date, raised adult fares from nine cents to ten cents on the surface lines and from ten cents to twelve cents on the rapid transit lines. The Authority was specifically exempt from any and all regulations of service and rates of fare by the Illinois Commerce Commission. Exhibit 1 (p. 487) shows the adult fare changes from the date of acquisition to April 1, 1949.

The various labor unions served notice on the Authority sixty days prior to the termination of the agreements, which expired on May 31, 1949, indicating their desire to open the contracts for adjustments of wages and working conditions. The unions requested an increase of fifteen cents an hour in wage rates which, together with changes in working conditions that were proposed, would add a total of $11,000,000 per year to the labor costs based on the employment level at the time the new contracts were negotiated. Exhibit 2 shows the top trainman's basic hourly wage rates from May 25, 1947, to December 1, 1949, the rates currently in effect.

Exhibit 3 shows the condensed monthly operating statements of the Chicago Transit Authority from October 1, 1947, to April 1, 1949. This exhibit also shows the number of revenue passengers by months for the same period.

QUESTIONS

1. Would you recommend the union's request for a wage increase? Would you recommend a wage increase of any amount?
2. If an increase were granted how would you propose to finance the additional costs?

Case VII–3: THE PAPER INDUSTRY[1]

INTRODUCTION

Two paper companies co-operated in this inquiry by making available their cost records for the years 1936–38 and by discussing their wage, price, and technological-change policies.

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[1] This case is drawn entirely from Temporary National Economic Committee, *Industrial Wage Rates, Labor Costs, and Price Policies* (*T.N.E.C. Monograph No. 5*) (Washington, 1940), pp. 28–42.

During the 1936–38 period, wage rate changes were made by these two paper companies after careful consideration of their profit and cash position. In the case of company A, the action of other paper companies and of industry generally was also watched by those responsible for wage policy, and in company B decisions on wage changes were influenced by negotiations with the union to which its employees belonged.

Changes in wage rates have affected the hourly earnings of company A's employees about proportionately, although changes in the volume of employment and in the proportion of women workers have also had some effect on the average for the plant. No data on hourly earnings in company B were available. Changes in wage rates have been followed by proportionate changes in labor costs per unit in company A, although here again fluctuations in the volume of output have been a factor. In company B both the volume of output and labor-saving technological improvements have affected labor costs, and there has been no close relationship between wage rate changes and movements in the company's labor costs per unit. By the end of 1938 direct labor costs per unit were only a little over 5 per cent above the early 1936 level, although wage rates had been increased nearly 20 per cent.

Labor costs are not so important as raw-material costs and fixed expenses in the total costs per unit of either company, nor do they fluctuate so widely. Costs and realizations have been closely related during this period, largely because of the flexibility of raw-material costs rather than through any attempt to fix prices on the basis of costs. Prices are, to a large extent, market-determined and not subject to administrative control by the company's management. These circumstances have combined to minimize the importance of labor costs in the prices at which paper is sold. Wage policy is almost unrelated to price policy, although it is important to the profits and to the general financial position of both companies.

Technological changes are made more or less as a matter of routine to reduce costs and to improve quality. Reduction in overhead costs has been a more important consideration in recent years than prospective savings in labor costs. The level of wage rates is not considered by officials to be of any importance in deciding on technological improvements.

According to the Census of Manufactures, in 1937 there were 841 establishments engaged in the production of paper and pulp, employing 137,803 wage earners and paying approximately $175,000,-

000 in wages. The total value of product for this industry was in excess of $1,200,000,000, and value added by manufacture was $484,000,000. The paper industry proper, with which this study is primarily concerned, comprised 647 establishments having 110,000 wage earners and a total wage bill of $142,000,000. Value of product was $958,000,000, and value added was $390,000,000.[2]

Two companies were requested to co-operate in this survey, and data were secured for one of the plants operated by each company for the period 1936–38 inclusive. Company A is a large producer of paper, with plants located at various points in the eastern part of the United States. It is engaged in the manufacture and sale of four chief types of product: (*a*) wood pulp, almost all of which is absorbed by its own paper mills; (*b*) book and other white papers; (*c*) other paper products; and (*d*) commercial by-products of the pulp-making processes.

The present study is concerned only with the company's largest mill, which in recent years has accounted for approximately half the total net sales of the company as a whole. The principal products of this mill are publication grades of book paper. Production of these grades comprised from 60 to 75 per cent of the total tonnage for the plant during the period studied.[3] They are sold either direct to publishers or through a sales agency on a flat commission basis. Other products of this mill include the lower grades of bond and envelope papers and certain similar specialties.

The mill has a full line of equipment. There are nine paper machines, as well as coating machines, supercalenders, rewinders, etc. There is a soda pulp plant which produces about 30 per cent of the requirements of the paper machines, using softwoods, most of which are grown in the vicinity by farmers and others. There is also a de-inking plant for the production of pulp from old magazines, etc. The balance of the pulp requirements is purchased in the open market.

The mill is well located from the point of view of access to raw materials. Although it is at a slight disadvantage in comparison with some of its competitors with respect to that portion of its pulp which it must purchase on the open market, this disadvantage is probably offset when the other sources of its pulp are taken into account. Fuel costs are likewise low. The company as a whole has an excellent reputation in the industry for progressiveness and efficiency.

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[2] U.S. Department of Commerce, Bureau of the Census, *Biennial Census of Manufactures*, 1937, Part I, pp. 556 and 563.

[3] The fluctuation in the percentages was mainly due to variations in the output of other grades. The volume of production of the publication grades was fairly steady throughout the period.

While the present survey was confined to the operations of the one plant as a unit, its position as part of a large organization must be kept in mind, since certain corporate policies are determined by the needs of the company as a whole and affect all its plants.

Company B, located in the eastern part of the country, is a much smaller concern than company A and is also smaller than its more important competitors. Four paper machines are housed in three mills, which are near to one another. The company has no equipment for the production of wood pulp, but de-inked book stock is made from old magazines and used in the production of certain grades of paper.

In technical equipment and operating efficiency the company has been at something of a disadvantage. Most of its machinery was installed many years ago, and the funds necessary for maintaining and improving their efficiency were not available during the depression. Since 1934, however, the equipment has been substantially modernized. The company's raw-material costs are probably close to the average of those of its competitors. Freight costs to the major eastern markets are low.

The production and sales policy of the company has been radically altered in recent years. Prior to 1930, large contract orders formed a major portion of total sales. Most of these contracts were lost or given up during the depression years when prices were falling rapidly. In recent years, smaller specialty orders have been substituted for these earlier contracts. This policy required heavy expenditures for research and experimentation, but it has resulted in greater diversification and less price competition. The larger companies are less likely to underbid on small and specialized orders. The consumer, moreover, is less likely to shift in order to make a small saving in price, since the papers have been designed to meet his particular specifications.

WAGE POLICIES

The wage policies of both companies studied are influenced greatly by their individual financial positions, although other factors, such as wage trends in industry in general and in the paper industry in particular, have provided broad guides to wage policy, particularly in the case of company A. Collective bargaining has played a role in the wage policy of company B but not in that of company A, which was not organized during the period covered by the study.

Company A. The wage structure of the company A plant surveyed was established about 1920 as the result of a job-evaluation study. The wage differentials set at that time have been changed somewhat in recent years, though no single outside influence has been of great importance in determining the present differentials. The going rate in the community is considered in establishing the base labor rates, and the rates paid by both near-by and distant competitors are used in establishing rates for the skilled and semiskilled paper-making jobs. Since the abandonment of a bonus system in December, 1936, substantially all employees have been paid on a straight hourly basis.

During the period covered in this study, the employees of company A's mill were unorganized. Some years ago the Brotherhood of Papermakers organized a large proportion of the workers, but negotiations for an agreement broke down and have not since been resumed. In recent years there has been no collective bargaining machinery, and changes in wages, hours, and working conditions have been made without consultation with the workers.

Final decisions with respect to general wage changes rest with the executive committee, composed of the president and two vice-presidents. According to company officials, wage changes are usually not discussed until the need for them has become apparent to all the executives. Consequently, discussion is usually confined to the extent, form, and timing of the change. The policy of the company is to make similar wage changes in all its mills simultaneously.

During the years 1936–38 three general wage changes were put into effect. On December 13, 1936, a basic increase of 10 per cent was granted, accompanied by additional increases of 1–5 per cent on individual jobs to compensate for the loss of bonus accompanying the concurrent discontinuance of an incentive system. While it is impossible to determine the precise extent of the average change in wage rates, it was probably substantially less than 10 per cent when full allowance is made for the elimination of the bonus. Wages were further increased by 5 per cent on August 8, 1937, and then decreased by 7 per cent on September 4, 1938.

According to officials of the company, these wage changes were made after consideration of the course of wage changes in other firms, both inside and outside the paper industry, and of the financial condition of the company. Trends in wages paid by other paper producers and by industry generally are watched closely by those responsible for wage policy. Naturally, the actions of paper producers located near the company's principal plant, which is the one here described, exert the most immediate effect. The company exchanges information regarding general wage rates with a number of its competitors, but, even in the absence of such a formal arrangement, wage changes made by any of its important competitors quickly become known. While it is not the policy of the company to lead in making wage changes, it avoids being the last to follow.

Although the decision to make a change is guided by conditions in industry generally and among other paper firms in particular, the amount and exact timing of wage changes are largely determined by the financial position of the company itself.[4] Wage increases are usually made after relatively long periods of increasing volume and profits. When volume is sustained at a level high enough to insure good profits, wage rates are likely to be raised; and when lower volume has reduced profits or resulted in losses, wage cuts become likely, although the pressure to reduce rates may not be great until the cash balance of the company becomes low. It is conceivable that these guides might on some occasion point in different directions. In actual practice, such conflicts have apparently been rare, primarily because all important mills in the country, even those making somewhat different grades of paper, are affected to a great degree by the same external conditions.

However, when most of the industry is reducing wages, officials of this company feel it important to take similar action, even though its profit position may not seem to officials to require a wage reduction. This policy is based upon the belief that failure to reduce wages during a downturn would not avert pressure to increase wages during the ensuing upswing. The same reason is given for the policy of changing wages simultaneously in all the company's mills regardless of the conditions prevailing in any one mill.

Exhibit 1, listing the wage changes made by company A and three leading competitors from 1932 to 1939, reveals the broad similarity in direction and magnitude without any consistent pattern of closely grouped changes which the foregoing statement of the basis of wage

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[4] It is only natural that company-wide changes should be based on company-wide profits rather than on the condition of individual plants.

Exhibit 1

TIMING AND APPROXIMATE AMOUNT OF WAGE CHANGES, 1932-39,* SELECTED COMPANIES IN THE PAPER INDUSTRY (IN PERCENTAGES)

	Company A	Competitor X	Competitor Y	Competitor Z
June 1, 1932		-10		
June 5, 1932			-10	
July 1, 1932				-3 to -6
August 1, 1932	-10			
January 22, 1933			-10	
April 2, 1933		-10		
July 1, 1933		+11.1		
July 24, 1933	+11			
July, 1933				+10
July 30, 1933			+11	
August 1, 1933				+15
August 7, 1933		+12.5		
October 15, 1933			+12	
May 15, 1934		+5		
July 9, 1934	+4			
October 1, 1934				+2.5
November 1, 1934			+5	
December 1, 1936			+5	+10
December 13, 1936	+10			
January 3, 1937		+10		
February 28, 1937			+5	
April 15, 1937				+5
June 1, 1937			+10	
July 19, 1937		+5		
August 8, 1937	+5			
August 7, 1938		-10		
September 4, 1938	-7		5	
November 1, 1938				-10
January 1, 1939		+5		
March 1, 1939				+5

* It should be understood that most of the figures shown in the above table are only approximate, since many readjustments in differentials were made at the time of most of the changes.

Source: These statistics were compiled for a study of wage changes in the paper industry from 1929 to 1939 made by W. R. Maclaurin and J. A. Brownell.

policy might lead one to expect.[3] On the whole, the wage changes made by company A have been fewer and smaller in extent than those of its competitors. According to company officials, this is largely due to their large contracts, which have given them a more uniform volume of business and steadier employment than most of their competitors.

Company B. In general, wage changes made by company B have been determined independently of the action of the other paper companies or of industry generally, according to company

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[3] None of these companies is a competitor with company A for labor.

Exhibit 2

TIMING AND APPROXIMATE AMOUNT OF WAGE CHANGES, 1930-39, SELECTED COMPANIES IN THE PAPER INDUSTRY*
(IN PERCENTAGES)

	Company B	Mill M	Mill N	Mill O	Mill P
December 1, 1930			-10		
February 25, 1931	5				
August 31, 1931			-5		
October 4, 1931	-5				
May 16, 1932				-10	
August 18, 1932			-10		
September 12, 1932	15				
November 14, 1932				-15	
December 2, 1932					10
January 1, 1933	-10				
January, 1933		10			
January 23, 1933			-25		
July 24, 1933	+10				
August 1, 1933				+10	
August 16, 1933					+10
August 28, 1933			+15		
December 1, 1933				+10	
May 13, 1934	+10				
May 14, 1934				+10	
November 7, 1934					+10
August 26, 1935			+10		
January 19, 1936	+10				
June 7, 1936			+5		
November, 1936		+11			
December 13, 1936			+10		
January 4, 1937	+8				
March 10, 1937					+10
March 29, 1937				+7	
July 4, 1937	+10				
July 5, 1937					
July 20, 1937					+10
July 25, 1937			+8		
September 13, 1937				+7	
November 16, 1937					+10
October 16, 1938			-7		

* It should be understood that most of the figures shown in the above table are only approximate, since many readjustments in differentials were made at the time of most of the changes.

Source: These statistics were compiled for a study of wage changes in the paper industry from 1929 to 1939 made by W. R. Maclaurin and J. A. Brownell.

officials. The company has been largely guided by its own financial position and has paid little attention to the general trends of the industry. Exhibit 2 shows the changes in wage rates made by company B and by four other paper firms located in the same general area in the period between 1930 and 1939. There is little uniformity apparent between these mills in the timing or extent of wage changes. This may be due partly to the fact that only one of the other mill produces paper which is strictly competitive with company B, although all have at least some similar operations and compete to some extent in the same labor market.

During the last few years, the employees of company B, as well as those of other mills in the area, have become organized in a union affiliated with the American Federation of Labor, and the union has thus become a factor in its wage policy. This union was not formally recognized by company B until 1937, though many of its workers had been members for several years preceding that time. Since the advent of the union, there has been a tendency for wage changes in firms in the vicinity to be more closely related. Fairly uniform minimum rates prevail, but there remain material differences between mills with respect to rates paid for the more skilled operations. The persistence of these differences may be due to the fact that skilled workers have little opportunity to shift from one of these plants to another.

Over the period 1936–38 there were three general increases in wages put into effect by company B. The volume of production had increased substantially during 1935, and this fact, coupled with the growing activity of the union, largely explains the 10 per cent increase of January, 1936. Production continued to rise, and a second increase was made in January, 1937, with many other mills increasing wages at approximately the same time. In July, 1937, after 8 months of near-capacity production, the union was officially recognized and wages increased by another 10 per cent. As in the case of company A, wage increase are made when volume is large.

It is interesting to note that, although wage decreases were general throughout the paper industry in 1938, only one of the mills in this area followed the trend, and this was a mill which was controlled by a company having various plants in other parts of the country. There seems to have been a general reluctance on the part of each of these companies to take the lead in seeking a cut; it was probably believed that a reduction would cause more difficulties than the savings would warrant.

WAGE RATES AND AVERAGE HOURLY EARNINGS

The relation in company A between changes in wage rates and in average hourly earnings has been examined for the period 1936–38

Exhibit 3

EMPLOYMENT AND EARNINGS, COMPANY A

(1936–38 Average = 100)

Year and Period (Number)	Total Number of Employees	Ratio of Women to Total Employees	Average Hourly Earnings
1936			
1	88	6.3	102.1
2	94	7.2	101.0
3	102	8.5	98.4
4	107	8.0	98.2
5	109	8.7	98.4
6	101	6.5	99.6
7	96	4.9	101.4
8	95	4.5	101.7
9	95	4.7	101.2
10	100	4.7	101.4
11	105	5.8	99.8
12	110	6.0	85.5
13*			
1937			
1	112	6.3	106.2
2	115	6.4	105.5
3	116	6.7	106.0
4	117	7.4	105.5
5	117	7.4	106.2
6	116	7.5	106.5
7	116	7.9	107.1
8†	116	7.2	107.1
9	116	7.6	112.0
10	116	8.3	111.8
11	116	7.9	112.2
12	115	8.0	113.3
13	113	8.2	114.1
1938			
1	111	7.8	113.8
2	111	7.6	114.1
3	111	7.6	114.1
4	110	7.4	115.0
5	109	7.2	115.2
6	107	6.6	114.7
7	107	6.5	114.3
8	105	6.4	114.9
9‡	104	6.5	114.9
10	104	6.5	106.9
11	106	7.3	106.5
12	107	7.4	106.3
13	132	7.3	106.5

* Figures for thirteenth period of 1936 were not available. Wage rates were increased 7–10 per cent on December 13, 1936.

† Wage rates were increased 5 per cent on August 8, 1937.

‡ Wage rates were decreased 7 per cent on September 4, 1938.

(figures for company B were not available). Hourly earnings for company A are reported for 4-week accounting periods, with 13 such periods in each year.

In general, the average hourly earnings of employees of company A varied in close relation to changes in the level of wage rates. Exhibit 3 shows that each change in wage rates was followed by almost an exactly proportionate change in average hourly earnings in the succeeding accounting period.

Average hourly earnings are also affected somewhat by changes in the volume of employment, and to a lesser extent, by the ratio of women employees to total employees. This is illustrated in Exhibit 3. The largest fluctuations in average hourly earnings without a general change in wage rates were in the year 1936, when major variations in the volume of employment and in the proportion of women workers resulted in changes of as much as 4 per cent. Earnings declined as employment expanded and the ratio of women workers rose, and increased as these trends were reversed. This relation is partially explained by the policy of the company in starting new employees, or old employees transferred to new jobs, at the beginning rate for the particular job. These rates are increased automatically by 2 cents an hour every 3 months until the full rate for the job is reached. It requires 9 months for the lower-paid jobs and as long as 18 months for more highly paid work to reach full-time rates.

A significant exception to this relation between earnings and employment is provided by the thirteenth period in 1938, when employment rose about one-fourth without any appreciable change in average hourly earnings. A complete explanation of this exception is not available, but it is known that the increase in employment was attributable to the Fair Labor Standards Act. It may be that the additional employees required by the act, unlike those added when business expands, were of about the same average skill as those already on the job.

WAGE RATES, LABOR COSTS, TOTAL COSTS, AND PRICES

Although employees are primarily interested in wage rate changes as they affect hourly earnings, to the employer their chief importance lies in their influence on labor costs and, through them, on total costs and prices. As in the case of the other industries included in the present study, these questions can be approached only through an understanding of the accounting procedures used by each company.

ACCOUNTING PROCEDURES

The system of cost accounting used by company A has the reputation of being one of the best in the paper industry, and it is unquestionably thorough and detailed. However, it is not designed in such a fashion as to provide ready answers to the questions toward which the present inquiry is primarily directed.

The chief objective of the accounting systems of both companies is departmental control. Both standard and actual costs are computed, but only standard costs are available for particular grades of paper. Comparisons of the sort made in this inquiry are wholly satisfactory only when they can be made for a single, reasonably homogeneous product, such as a single grade of paper. In this instance the standard costs for one grade of paper could not be used, however, as they are not broken down by functions, such as labor, materials, overhead, etc. Hence actual cost figures have had to be used, though they are available only for the entire output of the selected plant rather than for single grades of paper.

Both company A and company B compile their accounting records for thirteen 4-week periods in each year. The data presented below are either for these periods or for averages of a group of consecutive periods with similar characteristics.

Company A. Actual aggregate costs for all grades are computed by 4-week accounting periods, and are broken down into their most important components. These data are, of course, not entirely satisfactory for analysis of changing total costs in relation to wages and prices, the chief difficulties arising from the variation in the proportions of the various grades of paper in the total output. There is no way in which the effect on costs of this variation can be measured. For example, if labor costs per unit of output have risen, the rise may have been due to an increase in wages, to lowered efficiency, to the production of a larger share of grades of paper requiring proportionately more man-hours of labor, or to a combination of all these factors. The difficulties of interpretation thus imposed are real and, for the present inquiry, insurmountable.

Another major problem arises from the fact that administrative, selling, and interest expenses are not allocated to individual mills.

Only manufacturing costs are computed for each mill, all other expenses and all income merely being lumped together for the company as a whole. In order to get an indication of the actual net profit for the particular mill, it was necessary to make an *ad hoc* allocation of these expense items. Net administrative expense was allocated on the basis of tonnage sold by each mill. Commission expenses were distributed on an actual basis, other selling expenses in proportion to tonnage sold. Interest charges were allocated on the basis of the book value of plant and equipment in the various mills.

Total costs, as presented in the subsequent discussion, are thus a composite of actual manufacturing costs and a hypothetical allocation of administrative, selling, and interest expense made especially for this inquiry. The results are expressed in terms of costs per ton. Since the number of tons produced in a given period does not coincide with the number sold, the more appropriate of these two items has been chosen as the divisor in each case. All the items included in manufacturing costs have been divided by the number of tons produced; the other items have been divided by the number of tons sold.

These total cost and net profit figures have all been calculated for the specific purposes of this inquiry. Since they were not computed in the course of the ordinary business practice of the company, they could not have been used by executives as a guide to the determination of policies. They do, however, afford an indication of the changes in profitability of operations for the particular mill over the 3-year period.

One further point should be mentioned in connection with the accounting procedures of the company. Certain items, notably social security taxes, which obviously bear a direct relation to expenditures for labor, are not included in the "labor" components of manufacturing costs. In the summaries of actual manufacturing costs which are regularly compiled for each 4-week period, these taxes are included under the general heading for "Depreciation, etc." A similar disposition is made of charges for workmen's compensation and group insurance. In 1938 these three charges taken together amounted to approximately 6 per cent of total payroll. In Exhibit 6 they have been included under item 11, "Insurance, taxes, and miscellaneous."

Company B. In the case of company B, the accounting methods are of more than ordinary interest. "Actual" costs are compiled for each 4-week period for all grades of paper combined. These same costs, broken down by departments, are used for purposes of cost control. Actual costs are divided into three groups—raw materials; controllable (or variable) mill expense, such as direct labor, most of the indirect labor, supplies, fuel, social security taxes, etc.; and fixed expense, including depreciation, taxes, insurance, repair materials, labor for maintenance of the outside of buildings, administration, and selling expense other than commissions. The data presented below refer to these actual costs and have the same limitations as the actual cost figures used for company A.

Both the standard and the actual cost figures of company B are set up to indicate readily what portion, if any, of the fixed expenses have been covered. Thus they both emphasize the fact that the mill cannot afford to turn down any order on which the price will cover all the variable expenses and some of the fixed charges unless other orders can be secured at higher prices.

WAGE RATES AND LABOR COSTS

In general, direct labor costs in the two companies studied rose when wage rates were increased and fell when rates were cut. However, the relation between wage changes and changes in labor costs per unit of output in the plants of companies A and B has been neither simple nor direct but has been affected by a number of factors, two of which deserve special emphasis. In the first place, labor costs per unit depend to a considerable degree upon the volume of production of the mill as a whole. With a larger volume, longer runs are possible, and the time required for starting and stopping operations is reduced.[5]

In the second place, technological improvements were made in the 1936–38 period, particularly in company B's plant, which reduced labor costs materially. A 19 per cent increase in wage rates over this period in company B's plant was accompanied by an increase of only 6.4 per cent in direct labor costs.

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[5] When business is scarce, orders will be put on the machines almost as they come in, and almost every change in the grade being turned out is costly. But when a mill has a large backlog of orders, longer runs of a single grade can be made at a considerable saving. When business is scarce, most mills will take orders for grades which cannot be run as efficiently as their regular grades or which require costly experimentation before a satisfactory sheet of paper is produced. A third factor is that a certain amount of time is lost each week in starting up and shutting down the continuous operations in a paper mill, but this time is no greater in a 6-day than in a 4-day week, so that production per hour tends to increase as the operating time per week increases. If a mill can run 7 days a week, the start-up and shut-down time are eliminated entirely, but this cannot be done for more than a few weeks in succession, as shut-downs for repairs are required.

These conclusions must be expressed in general terms, since they are not based on labor costs for a homogeneous product but for all grades of paper produced. Labor costs per ton of production will obviously vary with the type of product. When a larger proportion of the output of the mill consists of grades which require the use of more labor in finishing operations, unit labor costs naturally tend to increase. In similar fashion these costs depend upon the size of the paper machines, different grades of paper being produced on machines of different sizes; in general, they are lower for grades produced on the larger machines. If grade labor costs had been available, this difficulty would have been avoided.

Exhibit 4

WAGE RATES AND LABOR COSTS PER UNIT, COMPANY A

(Average of First 12 Periods of 1936 = 100)

Date	Amount of Wage Change (Per Cent)	Operating Labor Costs	Repair Labor Costs	Total Labor Costs	Average Production per Period
1936 (first 12 periods)* December 13, 1936	+7 to +10	100.0	100.0	100.0	100.0
1937 (first 8 periods) August 8, 1937	+5	104.4	110.8	105.0	129.1
1937 (last 5 periods)		112.4	133.3	111.1	115.9
1938 (first 9 periods) September 1, 1938	−7	100.8	123.5	110.9	102.7
1938 (last 4 periods)		106.2	129.4	108.2	102.2

* No data were available for the thirteenth period.

Since it was necessary to use costs for the entire plant output of all grades, changes in labor cost figures from month to month may be due to changes in the proportions of different grades of paper made. In order to diminish the importance of fluctuations of this character, the labor cost figures are presented as averages of a group of periods usually separated by a wage change. This procedure assumes that monthly variations in the importance of different grades of paper in the output of each plant will tend to balance out in the course of several periods.

It is clear from Exhibit 4 that general changes in wage rates were accompanied in this plant of company A by changes of unit labor costs in the same direction. There was, however, no precise correspondence in the extent of the changes. Between 1936 and the first eight periods of the following year, wages were increased by something less than 10 per cent, but labor costs increased by only 5 per cent. Undoubtedly the explanation of this divergence lies largely in the fact that the volume of production had increased by almost 30 per cent. During the last five periods of 1937, after a further 5 per cent increase in wages, labor costs advanced 8.8 per cent. Again, the variation in production seems to account for the discrepancy; the volume of production fell off by more than 10 per cent between the two parts of the year. During the first nine periods of 1938, unit labor costs were 2.8 per cent lower than during the latter part of 1937, in spite of the fact that no general change in wages had been made and that production had decreased. The change in labor costs between these two periods of time is probably explainable in terms of the changing composition of the output. Publication grades of paper, which require less labor per ton, accounted in the earlier months for approximately 63 per cent of total tonnage; this proportion increased to more than 70 per cent in the later months.

The explanation of the change in labor costs which occurred between the two parts of 1938 is not so clear. Following the general 7 per cent reduction in wages, labor costs fell by only 2.3 per cent. Operating labor costs fell by 3.2 per cent. Changes in the volume and nature of production were insignificant and would not account for the differences. The fact that labor costs failed to decline as much as wage rates is probably connected with the increase in employment, following the adoption of the Fair Labor Standards Act, which has already been noted. It is probable that the addition of new employees, to the extent of almost 25 per cent of the existing force, brought down the average level of efficiency by an amount sufficient to account for the discrepancy. If the last four periods of the year are considered separately, added weight is given to this hypothesis. For the tenth and eleventh periods, operating labor costs were almost 6 per cent lower than in preceding months; during the last two periods when the act was in effect, they were almost exactly the same as they had been during the early part of the year.

In summary, it may be said that the movements in unit labor costs have had a tendency to parallel those in wage rates, except for variations in the volume and nature of production. There is no evidence that systematic changes in labor policy or production methods were made to compensate for the changes in wage rates. This conclusion is consistent with the history of technical changes over the period.

Company B. For company B, the relation between general changes in wage rates and in labor costs is indicated in Exhibit 5. In each instance the 4-week accounting periods are divided into groups. The grouping conforms primarily with the dates of the general wage changes, although no change in wages intervened between the last half of 1937 and the year 1938.

It is quickly apparent that the variations in direct and indirect labor costs bore little relation to the wage changes. The 8 per cent wage increase of January, 1937, was followed by a rise of only 2.5 per cent in direct labor costs per ton and by an actual fall in indirect labor costs. The second wage increase, 10 per cent, was followed by a rise of 2.9 per cent in direct and of more than 25 per cent in indirect labor costs. With no intervening wage change, direct labor costs rose slightly in 1938, while indirect labor costs fell by almost 6 per cent.

Exhibit 5

WAGE RATES AND LABOR COSTS PER UNIT, COMPANY B

(1936 Average = 100)

Date	Amount of Wage Change Per Cent	Direct Labor Costs	Indirect Labor Costs	Tonnage Production per Period	Average Production per Machine-Hour
1936 (13 periods) January 4, 1937*	+8	100.0	100.0	100.0	100.0
1937 (first 6 periods) July 4, 1937	+10	102.5	97.1	128.7	105.3
1937 (last 6 periods)		105.5	121.6	95.0	110.2
1938 (13 periods)		106.4	114.5	91.9	109.2

* Approximately

Most of these differences in rate of change are probably explained by variations in the volume of production and by the gradual increase in "production per machine per hour" through technical improvements over the 3-year period. In general, indirect labor costs tended to vary inversely with the volume of production, when allowance is made for the general wage changes. This is not true, however, when a comparison is made between 1937 and 1938; from the data at hand, it is not possible to explain the decline which took place in these costs during the latter year. Direct labor costs tended to vary inversely with the average "production per machine per hour," again making allowance for the general increase in wages.

Neither direct nor indirect labor costs advanced as much as wage rates over the period as a whole. As a result of the two increases, wages were approximately 19 per cent higher in 1938 than they had been in 1936. Direct labor costs were only 6.4 per cent higher and indirect labor costs 14.5 per cent higher. Had the volume of production been as great in 1938 as in 1936, it is probable that indirect labor costs per ton would have been even lower in the latter year. The basic reason for the smaller increase in costs is undoubtedly to be found in the larger production per machine per hour, this being, in turn, primarily due to technological improvements which permitted the machine to be run at a more rapid pace.

LABOR COSTS, TOTAL COSTS, AND PRICES

It is difficult to obtain a clear picture of the relation between the wage and price policies of company A and company B during a business cycle from the data secured in this survey. The impact of a prolonged period of low volume on wage and price policies is not disclosed in such a brief period as 1936-38 Moreover, the data assembled have certain limitations, already indicated. The cost and price information available is for the entire output of each mill rather than for a single product, and hence changes in cost-price relationships are in part attributable to shifting proportions of different grades of paper in the total output. This difficulty, together with the practice of selling most of their paper on a contract basis with the possibility of a different price for each sale, makes it difficult to identify turning points in price trends for companies A and B. The statistics describe the effect of executive action on prices only indirectly. It is possible that one result is an overemphasis on the role of the market in paper prices as contrasted with company policy.

Nevertheless, it is clear that cost structure and the competitive situations of these companies put definite limits on the importance of wages in determining prices. The cost structure of the paper industry not only relegates wage policy to a secondary position but also influences greatly the reaction of each company to market and competitive pressures.

Between 1936 and 1938 labor costs per unit of output ranged from 13.3 to 14.2 per cent of total unit cost in company A and from

11.5 to 12.4 per cent in company B, taking the averages for the group of accounting periods shown in Exhibits 6 and 7. It is apparent that during this period they have represented a remarkably stable proportion of total costs, despite the fact that wage rates in company A were increased by 16 per cent and in company B by 19 per cent. These increases were not fully reflected in the unit labor costs of the two companies, partly because increased volume made possible the more efficient utilization of labor and also, especially in the case of company B, because of the installation of labor-saving machinery.

Exhibit 6

COST COMPONENTS AS A PERCENTAGE OF NET PRICE PER TON, COMPANY A

	1936	1937		1938	
	First 12 Periods*	First 8 Periods*	Last 5 Periods*	First 9 Periods*	Last 4 Periods*
1. Average net price per ton	100.0	100.0	100.0	100.0	100.0
2. Raw materials, fibers	34.51	29.82	28.39	35.26	36.35
3. Raw materials, others	13.96	21.96	22.96	11.14	10.15
4. Total raw materials	48.47	51.78	51.35	46.40	46.50
5. Operating labor	12.68	12.08	12.41	12.71	12.76
6. Repair labor	1.17	1.15	1.36	1.32	1.43
7. Total labor	13.85	13.26	13.77	14.03	14.19
8. Supervision	2.25	1.77	1.96	2.44	2.26
9. Clerical	1.43	1.20	1.39	1.42	1.28
10. Supplies	6.31	5.29	5.96	5.45	6.10
11. Insurance, taxes, and miscellaneous	2.20	1.97	1.99	2.70	2.23
12. Fuel and water	3.70	3.26	3.26	3.83	3.88
13. Total manufacturing cost (items 4, 7, 8, 9, 10, 11, 12)	78.21	78.59	79.68	76.27	76.80
14. Selling expense	3.09	3.20	3.02	2.98	3.04
15. Administrative expense	4.90	4.03	4.11	5.19	5.32
16. Interest	2.15	1.68	1.72	1.79	2.18
17. Depreciation	6.51	5.30	5.63	7.12	7.46
18. Balance, profit	5.14	7.20	5.84	6.65	5.21
Total fixed expenses (items 8, 15, 16, 17)	15.81	12.78	13.42	16.54	17.21

* Accounting periods of 4 weeks each.

Labor costs as a factor in total costs are overshadowed both in absolute magnitude and in the extent of their fluctuations by raw-material costs and by fixed expenses. Raw-material costs, primarily pulp, averaged a little less than 50 per cent of total costs in company A and a little more than 50 per cent in company B. Fixed expenses for these plants (supervision, administration, selling expense, interest, and depreciation) ranged from 12.8 to 17.2 per cent of total costs in company A and from 13.3 to 20.1 per cent in company B (see Exhibits 6 and 7). Fixed expenses per unit decline when volume is expanding and increase when less paper is being produced.

Exhibit 7

COST COMPONENTS AS PERCENTAGES OF NET PRICE PER TON, COMPANY B

	1936 13 Periods*	1937 First 6 Periods*	1937 Last 6 Periods*	1938 13 Periods*
1. Net price per ton produced	100.0	100.0	100.0	100.0
2. Book pulp	16.8	18.4	19.5	16.3
3. Other raw materials	39.7	41.3	40.1	39.4
4. Total raw materials	56.5	59.7	59.6	55.7
5. Direct labor	6.0	5.9	5.7	6.0
6. Controllable indirect and repair labor	6.0†	5.6	6.5	6.4
7. Total labor	12.0	11.5	12.2	12.4
8. Controllable mill expense	11.3	10.0	11.2	10.2
9. Total controllable cost (items 4 + 7 + 8)	79.8	81.2	83.0	78.3
10. Gross profit (item 1 minus item 9)	20.2	18.8	17.0	21.7
11. Fixed mill expense	5.0	4.1	6.2	7.2
12. Administrative expense	5.0	3.9	4.4	5.0
13. Selling expense	4.7	2.9	3.7	4.4
14. Depreciation	3.1	2.4	3.1	3.5
15. Total fixed expenses	17.8	13.3	17.4	20.1
16. Operating profit (item 10 minus item 15)	2.4	5.5	−0.4	1.6
17. Other income less other charges	0.1	0.2	0.4	0.4
18. Loss on rejected paper	−1.1	−0.2	−0.2	−0.4
19. Net profit or loss per ton	1.2	5.5	−0.2	1.6

* Accounting periods of 4 weeks each.

† Approximate figure only for 1936, as the breakdown was changed after the 8th period.

Even in so short a period as the three years 1936–38, volume changes were great enough to cause wide swings in fixed charges per unit.

The movements of unit raw-material costs have been, in general, opposite to those in fixed expenses per unit, rising when business is good and falling when business is poor. Yet raw materials are such a large proportion of total costs that the latter figures have followed closely the changes in raw-material costs. Labor cost changes have in nearly every case been in the same direction as the changes in raw-material costs, but too small in size to influence appreciably the total cost figures.

Not only have changes in labor costs played a minor part in each company's costs, but total unit costs have not been an important factor in price policy. The officials of these two companies can play only a limited role in determining the prices of their products. In fact, prices are spoken of by company officials as fixed for them "by the market." However, the fact that company B has recently concentrated primarily on specialty grades of paper permits that concern a somewhat greater degree of freedom from price competition than company A, whose major product is publication grades of paper.

Despite the importance of the market in determining prices, costs and realizations for both those companies have been closely related during the period 1936–38. This is due largely to the importance of raw materials in total costs, a fact to which reference has been made above. Pulp prices fluctuate widely; the average raw-material cost per ton for company A was over 20 per cent larger for the last five periods of 1937 than it was during the year 1936. When shorter periods are compared, the differences are much greater. Changes in raw-material prices are generally similar for all producers and vary in rough correspondence with activity in the paper industry. Consequently, when business is good, the prices of both raw materials and paper tend to rise, while, when volume is declining, both raw-material prices and paper prices decline. Thus costs and realizations for those companies have moved together, more because both were under similar industry-wide pressures than because prices were fixed on the basis of costs.

This tendency for prices of the finished product and the principal raw material to move together makes profits dependent primarily on changes in other manufacturing costs, largely labor and overhead costs. The situation is similar to that in the cotton textile industry, which puts great emphasis on changes in mill margins. In the paper industry, overhead costs represent more than half these "other manufacturing costs." This fact, together with the dependence of unit overhead costs on the volume of production, accounts for the attitude of paper company officials toward volume and for the common slogans in the industry, "keep the machines running" and "get the volume."

This situation also explains the price policies followed by these companies during severe depressions. According to officials of both companies, the pressure of fixed charges is sufficient to require that every effort be made to sustain volume. To do this, prices are cut in periods of severe and prolonged depression to a level which may just cover variable costs, i.e., materials and labor, and some part of fixed expenses. It is at such times, according to company officials, that costs play an important part in price policy, fixing a lower limit below which prices will not be cut. This function of costs is clearly recognized by company B, which breaks down all its cost figures into fixed and variable costs.

The importance which company B attaches to this distinction between fixed and variable expenses may be illustrated by a concrete example. During a period when the volume of production was low, the firm had an opportunity to secure a large order from a concern whose credit rating was low. After some deliberation, the company finally accepted the order on the basis of (1) cash on delivery for an amount carefully calculated to cover all the variable expenses and (2) long-term notes for the balance of the price. The notes were never paid, since the purchasing company went out of business before they fell due. Officials feel that no real loss was sustained, inasmuch as no other orders were obtainable at the time, and this order permitted them to maintain their organization and provide employment.

Only under these rather exceptional circumstances are changes in labor costs of any considerable importance in price policy. At such a time a reduction in wage rates will reduce variable costs and permit lower prices than would otherwise be possible. At no time during the 1937–38 recession did such a situation arise, although volume declined rather sharply.

Changes in labor costs are important in the view of both companies to their cash position and to their profits. When business is depressed, the cash position of the company becomes an important management problem. Capital expenditures may be curtailed, raw-material inventories reduced, and dividends suspended. The largest cash item remaining within the control of the company is the labor bill. The management of both companies feel that in such a situation even a small percentage reduction in wage rates is a substantial help.

TECHNOLOGICAL CHANGES

In both company A and company B, technological improvements reduced labor costs during the relatively short 1936–38 period, and in one of them the reduction was very substantial. In these two well-established paper companies, technological changes are made under a constant pressure for improvement in product and reduction in costs, and their effectiveness in limiting the influence of recent wage rate increases on labor costs has played only a minor role. Improvements in quality and reduction in overhead and material costs were even more important objectives of technological improvements than were savings in labor costs.

During the years 1936–38, company A spent substantial sums for new equipment and for improvements on older equipment. In the mill which has been the particular subject of this inquiry, the major changes were not such as to produce radical alterations in techniques or costs. In 1936, for example, when capital expenditures were approximately twice as great as in either of the other two years, the bulk of the money was spent for additional equipment of the same type as that already in use. The major consideration in deciding on capital expenditures is the rapidity of return expected from the investment. On all large investments the development engineers or the officials of the operating department discuss the proposal with the plant manager. If he approves, estimates of its cost and of its expected effect on paper costs and quality are submitted to the vice-president in charge of operation of all mills. If he indorses the proposal, a request for an appropriation is made to the quarterly meeting of the board of directors, which makes the final decision.

The chief reason for the technological changes which were made is described by company officials as a desire to improve the quality or uniformity of the product or, in more general terms, to keep abreast or ahead of the technical procession in the industry. A substantial proportion of the changes made in this mill, as elsewhere throughout the industry, brought this about primarily by improvements which increased the speed of the machines. These developments brought about some saving in labor costs, but they resulted in even greater savings in overhead costs, and this appears to have been the more fundamental reason for their introduction. It must be borne in mind, however, that machine speed is less important in a mill making many small orders than in a mill running for long periods on one grade. In the former case start-up and wash-up time constitute a substantial part of the total machine time per order. Company B has one large modern machine, installed in 1926, which is not considered suitable for small runs because of the high fixed charges that it carries, though it is more economical for large tonnage orders.

An examination was made of all the technical changes proposed or put into effect during the 3-year period by company A in the mill selected for study. There is no indication that the increases in wage rates exerted any influence on the amount or nature of the capital expenditures. Nor is there any indication that the desire to reduce labor costs was an important factor in bringing about capital expenditures. In only one instance was a prospective saving in labor costs emphasized as a reason for making a change, and this particular suggestion was not adopted.

Most of the major capital expenditures made by company B over the 3-year period 1936–38 were also for the primary purpose of improving the quality and uniformity of the product. As in the case of company A, a related objective was to run the machines at higher speeds. One of the largest projects, for instance, increased the drying capacity of one of the paper machines. Since this had been the factor limiting the speed of this particular machine, higher machine speed resulted, with a consequent reduction of all important costs except raw materials. There were many other improvements of a similar nature.

From a survey of the technical changes actually introduced and from information supplied by officials of the company, it is clear that there was little or no causal connection between increased labor costs and the introduction of improvements. Only one change during the entire period could be attributed mainly to an expected reduction in labor costs, and this was a minor purchase of equipment. To be sure, the increase in the speed of machines tended to lower labor costs, but this was not the most important effect of the changes, and it was not the primary reason for making them.

QUESTIONS

1. What is the effect of changes in wage rates upon paper prices? How is this explained?
2. What is the relationship between changes in wage rates and changes in unit costs?
3. Does the over-all cost structure of the paper industry have any relationship to the effects of changes in wage rates?
4. Did the fact that Company A employed non-union labor while Company B employed union labor cause a significant difference in the effects of wage changes upon total costs of both companies? How would you explain this?
5. It was concluded that, in the paper industry, changes in wage rates had little effect upon technological improvement. Under what conditions would you expect changes in wage rates to affect the rate of technological improvement?
6. How does accounting procedure affect labor costs in the paper industry? Would you expect this condition to be found in other industries?
7. On the basis of the information shown in Exhibits 6 and 7 for the year 1938, could both companies afford to pay a wage increase of 10 per cent? Why?

Case VII-4: UNITED STATES STEEL CORPORATION

The United States Steel Corporation controlled thirty-two principal subsidiary companies engaged in the production of a wide variety of iron and steel products. The principal subsidiary, the Carnegie-Illinois Steel Corporation, produced in excess of 70 per cent of the total capacity of steel ingots and castings of the United States Steel Corporation.

In 1936 the Carnegie-Illinois Steel Corporation began wage negotiations with the Steel Workers' Organizing Committee and, in an agreement dated March 2, 1937, recognized this group, or its successors, as the collective bargaining agent for those employees who were members of the Amalgamated Association of Iron, Steel, and Tinworkers of North America. On May 14, 1942, the Steel Workers' Organizing Committee changed its name to the United Steelworkers of America. Since the formation of the Steel Workers' Organizing Committee in 1936, wage negotiations in the steel industry have fallen into three phases: first, the pressure by employers to reduce wages during the recession of 1938; second, the war years under the National War Labor Board; and, third, the postwar experiences. In recent years negotiations between the United Steelworkers and the Carnegie-Illinois Steel Corporation have set the pattern for the entire steel industry and, to some extent, for all large industries.

During the period of the second World War both wages and prices in the steel industry were fixed by governmental decree. The Office of Price Administration placed ceiling prices on steel products in 1941, which remained in effect, with slight modification, until early 1945. Wages were under the jurisdiction of the National War Labor Board until the cessation of the war. During the war, wage negotiations between the Steelworkers and the United States Steel Corporation consisted primarily of statements by each party of its position on wages and working conditions to the War Labor Board, who, after a period of study and investigation, rendered a decision, which, although not binding upon either party, was, in effect, in the nature of a decree, since both parties usually complied.

The chief wage adjustment by the War Labor Board was the so-called "Little Steel" formula which was announced on August 26, 1942. Other than adjustments intended to eliminate inequities between plants and additional payment for second- and third-shift work, there were no further wage adjustments as such until early 1946. The United Steelworkers, however, emerged from the war period with a number of other gains acquired by the directives of the War Labor Board. Among the more important of these were maintenance of membership agreements, the dues check-off system, more liberal overtime, holiday, and vacation allowances, and a minimum daily wage.

The Office of Price Administration, on January 11, 1945, authorized interim price increases on five steel products, pending the final report on its study of steel prices in general. The O.P.A. stated that these interim price increases were allowed separate and apart from the additional labor costs resulting from the directive of the War Labor Board on November 25, 1944, in which the board granted relief from wage inequities not to exceed 5 cents an hour for all employees and granted premiums for work on the second and third shifts, retroactive to January 4, 1944. United States Steel estimated the cost of the retroactive wage increases at $30,000,000. There were no further adjustments in steel prices until 1946.

Shortly after V-J Day, the United Steelworkers demanded of eleven subsidiaries of the United States Steel Corporation a general wage increase of $2 a day, retroactive to August 18, 1945, stating that this demand was not subject to compromise. The union based its claims upon the arguments that the steel companies had made profits of $2 billion during the war and that the companies would continue to make high profits for several years. Furthermore, the union argued, there were enormous hidden profits out of which additional wages could be shared with the Steelworkers. They further claimed that, in order to avoid another depression, an increase of $2 a day was necessary to the purchasing power of the steel workers, and, with similar increases in other industries, the purchasing power of the nation would be raised, thus keeping the wheels of industry going.

The United States Steel Corporation rejected the demand with a statement that no wage increase was possible. In a letter from Mr. John A. Stephens, vice-president, Industrial Relations, to Philip Murray, president of the United Steelworkers of America, it was stated: "Our answer is that existing ceiling prices for steel products, together with the Government's wage stabilization policy, do not enable us to grant a wage increase at this time." The company claimed that it was selling the great majority of its steel products at a loss because of increased labor, material, and service costs in the face of O.P.A. refusal to grant an increase in the price of steel products. It was estimated that an average increase of $7 per ton in the price of carbon steel products was necessary to meet those increased costs. This dispute resulted in a strike in the steel industry, which became effective on January 21, 1946, and which was terminated on February 15, 1946, when the O.P.A. allowed an increase of $5 per ton in the ceiling prices for carbon and alloy steel mill products. Under the terms of settlement a general wage increase of 18½ cents per hour was granted to the Steelworkers. In commenting upon the settlement, Mr. Benjamin Fairless, president of United States Steel, in a prepared statement remarked: "From the beginning of this wage dispute, we have taken the position that wages could not be separated from prices. . . . A price increase of $5 a ton will not be adequate to compensate for such past heavy increases in our costs and also to take care of what we estimate will be the total cost to us of this wage increase of 18½ cents an hour. . . . Higher labor cost in other businesses will inevitably result when a basic industry such as steel makes a substantial increase in its wage scale."

Upon removal of price controls from steel products on November 10, 1946, the average finished steel composite price per pound rose from 2.707 cents in December, 1946, to 2.873 cents in February, 1947.

On February 5, 1947, the United Steelworkers presented new demands for a wage increase, pointing out that the profits of the steel industry were the greatest in its history; that the industry could increase wages without increasing prices; and that the gains made in the wage settlement of February, 1946, had been entirely wiped out by increases in the cost of living. On April 22, 1947, a new contract was signed which provided a wage increase of 12½ cents per hour. It also provided that there would be no strike by the union before expiration of the contract on April 30, 1949, but that on April 1, 1948, either party might reopen wage negotiations and, if no agreement were reached by April 30, 1948, the provisions of the existing contract would remain in effect until April 30, 1949.

On August 1, 1947, the United States Steel Company announced a price increase averaging $5 per ton for various steel products. By December, 1947, the average steel composite price stood at 3.189 cents per pound. On February 12, 1948, the union served notice of its desire to reopen wage negotiations and on April 5, 1948, presented the following reasons why a substantial increase in wages should be made at this time:

1. Cost of Living

From the date of the 18½ cent increase in February, 1946, the cost-of-living has increased, according to the Bureau of Labor Statistics, from an index of 128.6 to a figure of 167.5 in February, 1948, an increase of 29.24%. This latter figure even includes the very slight drop in the cost-of-living, .8%, which occurred in February, by reason of the much discussed slump in prices in the commodity markets.

We do not have precise average hourly earnings figures for U.S. Steel for this period. Since U.S. Steel figures, however, so closely parallel those of the Industry it seems safe to use the Industry earnings figures. BLS figures show that Steelworkers earned $1.169 per hour in January, 1946, just prior to the 18½ cent increase. This increase should have raised Steelworkers' wages to $1.354. In order to adjust this figure for the subsequent cost-of-living increase from February, 1946, to February, 1948, it would be necessary to increase it by 39.6 cents per hour which would bring Steelworkers' average hourly earnings to $1.75 per hour. The only increase received by employees of the U.S. Steel Corporation during this period, however, were the 12½ cents per hour increase of last April and the inequities adjustments which averaged about 7½ cents per hour. It is stated in the annual report of the Corporation that its employees averaged $1.55 in 1947. Thus it would take an average increase of *20 cents* per hour to increase average hourly earnings by an amount necessary to offset the loss suffered during the last two years by Steelworkers through cost-of-living increases.

An examination of average weekly earnings for the same period yields a like answer. Average weekly earnings were $44.93 in the Industry in January, 1946. The 18½ cent increase on a 40-hour week should have raised this figure to $52.33 per week. It would take an increase of $15.30 in weekly earnings of $67.63 to offset the cost-of-living increases since February, 1946. Average weekly earnings of all employees of the U.S. Steel Corporation in 1947, were $50.64, a deficit of $7.99 per week or *20 cents* per hour.

You are well aware of the fact that workers in scores of other industries throughout the United States have been and are currently receiving sizeable increases in their wages. It is only natural, therefore, that members of the United Steelworkers of America should likewise expect that their employers will also grant substantial wage increases. The Corporation has made a great point in its annual statement and in its public press releases of the excellent cooperation between the employees and management during 1947. Even the very best efforts of the company and the union could not hope to maintain such relations if our members become convinced that this Corporation does not intend to accord our membership wage treatment similar to that being accorded by thousands of other corporations throughout the United States.

2. The Corporation's Ability to Pay a Wage Increase

It seems apparent from all the figures which are available to us that the Corporation can well afford to grant a substantial wage increase at this time

(*a*) *Increased Revenues.* Public reports of price increases indicate the ability of the Corporation and of other steelmaking and steel fabricating companies to absorb further production costs. President Fairless so testified regarding the ability of most non-integrated steel producers to absorb the recent hikes in the prices of semi-finished steel. The U.S. Steel Profit and Loss Statement is ample testimony of U.S. Steel's ability to absorb further cost increases.

It is obvious from that statement that the revenues of the Corporation have increased more rapidly than have wages and other costs since our last contract negotiations.

We do not have precise figures concerning the increased revenue which the Corporation is realizing on its present sales. We do, however, have industry figures furnished by the Industry's publications and it is apparent that U.S. Steel has shared in all of those major increases. The figures on the base price per ton of finished steel, as set forth in "STEEL" magazine, show that the average price per ton of finished steel increased $5.37 per ton from December, 1946, through March, 1947, just prior to our 1947 negotiations. Again in August, 1947, prices increased by $5.59 per ton. Between October, 1947, and February, 1948, average prices again increased by $5.73 per ton. Thus during a 15-month period the average prices of finished steel rose *$16.69* per ton.

The Steelworker's wage increase in 1947, according to Corporation estimates at the time, cost U.S. Steel approximately $75,000,000 per year or less than $4 per ton on U.S. Steel's present output of finished steel. We are well aware of the fact that other costs have increased also. It is clear, however, that revenue increases have outrun cost increases, since profit during this period has increased tremendously over 1946. Much has been said of the fact that Steelworker earnings have increased more since 1940, than have steel prices. It is obvious from the record, however, that it is not necessary for steel prices to increase as rapidly percentagewise as wages and certain other costs for the Corporation to earn a sizeable profit.

The Steelworker's share of the sales dollar received by the Corporation has actually decreased during the last year. In 1946, all payroll costs took approximately 47 cents out of each dollar received by the Corporation. In 1947 this figure was 42½ cents. Thus the worker's share of the revenue realized by the Corporation has decreased by 4½ cents out of each dollar taken in by the Corporation. Nearly one-half of this decrease has been absorbed by the increase in profits.

(*b*) *Profits.* The Corporation has reported net profits after taxes in 1947, of $127,098,148. Actually this is *not* the net profit after taxes of the Corporation, rather it is reported profit after a set aside of $26,300,000 for the extra costs incident to the replacement of its properties. The net profit as reported to the Bureau of Internal Revenue will approximate $153,000,000 instead of $127,000,000. In fact, in order to be comparable with the reported profits of previous recent years, it would be necessary to add another $6,000,000 to this figure to take into account the change in inventory systems which occurred in 1947.

The reported profit in 1947 was 43.5% higher than in 1946. This percentage increase would be much greater, nearly 80%, if the adjusted net figure were used. The reported profits alone, however, were exceeded by only three years in the Corporation's entire financial history, namely, 1916, 1917, and 1929.

The profit before taxes was $218,098,148, even if the $26,300,000 extra depreciation charge is excluded. This was the highest profit before taxes reported since 1942 and it resulted in a much higher net profit, of course, by reason of the fact that there was no longer an excess profits tax in effect.

The profit margin in the 4th quarter of 1947 was just as high as that during any of the other quarters of the year with the exception of the first, which is not comparable for several reasons. The further price increases which have occurred since that time and the lack of any sizeable cost increases should make the profit during the first quarter of 1948 substantially higher than in the 4th quarter of 1947.

The return on Net Worth was 8.41% in 1947 which is substantially above the 6% normally considered a fair return on risk capital. The Corporation has made much of the fact that its return per dollar of sales was only 6 cents in 1947. While this comparison may be a good operating guide for U.S. Steel management, it is not a sound guide for measuring annual profit as it is evidenced by the fact that with only a fractionally different return per dollar of sales in 1946 and 1947 the net profit for the two years varies tremendously.

The Corporation has argued that it needs a high profit currently in order to expand its facilities. It should be apparent that such modernization and expansion cannot be financed wholly out of retained profits. Yet this is apparently what the Corporation would like to do. So far as we know the Corporation has made no effort to secure outside capital to finance these expenditures. Never within our history has an industry attempted such a tremendous expansion out of retained profits. For the Corporation to do so today would mean either that prices would have to be raised even more or that we would have to forego a needed wage increase. We cannot agree with the wisdom of this policy nor can we acquiesce in its application to us. It would mean very simply that each and every Steelworker would have to pay for the company's expansion and modernization program in reduced living standards. We do not wish to deprive the Corporation of a fair profit. Nor do we wish to force a rise in steel prices. We believe that a wage settlement can be made within the present price structure which will grant us the needed wage increase and at the same time return a fair profit to the Corporation. We are well aware, however, that we cannot limit the company's action on prices. We can only bargain in terms of a settlement which is fair to ourselves and to the nation, and hope that the Corporation will maintain a policy of price restraint which is consistent with our settlement. Mr. Fairless has argued publicly that a steel wage increase at this time would be inflationary. Certainly it would be no more so than is the company's expansion and modernization program at this time. That program the company felt it needed and it has gone forward with it despite its inflationary effect. We do not believe that a steel wage increase would be inflationary at the present time. However, if it were, the Company's argument on this score is certainly not consistent with its other actions.

We are well aware of the fact that present profit levels are part and parcel of the current high demand for steel. Can anyone here, however, argue that there is any sound reason to believe that this high demand will not continue? Should the time come that the industry no longer has a high demand for its products we can then face the problems raised by that condition. Until such time arises, however, it is pointless for either of us to speculate concerning such a condition.

> (*c*) ***Productivity.*** Output per manhour has certainly increased during 1947 in the Steel Industry and in the fabrication plants. We have heard testimony from President Fairless that productivity has not increased. We know that this is not true. Even a cursory examination of the company's output and manhours figures in 1947 and 1946 indicate that whereas manhours worked increased approximately 18% from 1946 to 1947, both ingot production and finished steel production increased by nearly 34%. This increase in productivity alone offset a substantial part of the wage increase granted to the Union in 1947. By reducing labor costs it further improves the company's operating position and therefore its ability to pay us a substantial wage increase at this time.

On April 22, 1948, the following statement was released by Mr. Fairless, president of the United States Steel Corporation:

> In an endeavor to aid in halting further advances in living costs, the steel-producing subsidiaries of the United States Steel Corporation will shortly announce decreases, effective May 1, 1948, in their prices for a wide variety of steel products of their manufacture.
>
> These price changes are estimated to add up to a total price reduction by U.S. Steel of about $25,000,000 a year based on last year's shipments of the products affected. The price reduction will vary in amount for different products. No changes are to be made in the prices of certain products, such as semi-finished steel, where the relationship between present prices and costs does not permit a price reduction at this time. The new changes involve a total price reduction more than twice as large in amount as the total increased last February in our prices for semi-finished steel.
>
> So far as possible, the price reductions will be made applicable to steel products which have a more or less direct bearing upon the cost-of-living. As illustrations, lower prices will be applicable to a number of steel products which are bought by the consumer in the form in which they are manufactured by our subsidiaries, such as nails; wire fence; wire netting, steel fence posts, steel roofing and siding sheets for building; barbed wire and other wire products, and also to a number of steel products which are converted by our customers into articles for ordinary use by homeowners, such as tin plate for the manufacture of cans, cold rolled strip and sheets for automobiles; stainless steel for refrigerators, stoves, kitchen cabinets, washing machines, etc.; sheets for furnaces, air-conditioning ducts, and heating equipment; galvanized sheets for silos, grain bins and other farm structures; spring wire for furniture and other uses; as well as many other steel products.
>
> We, in the United States, believe that costs and prices in general are too high for the good of the nation. We are firmly of the conviction that American industry and labor should cooperatively do everything in their power to avoid further increases in costs, which, if permitted to occur, must result in higher prices for almost everything we buy. Certainly the

best interest of all of our people will not be served by further lowering in the purchasing power of the dollar.

We are hopeful that our action in reducing the prices of a number of steel products associated with the cost of living may have a beneficial effect throughout the nation and may be helpful in bringing about an early stabilization of reduction in the cost-of-living. To achieve this worthy result, there must be cooperation by both business and labor and Government. If this should prove to be the outcome, everyone in this country will benefit. If, on the contrary, costs should continue to advance, then in fairness to our employees and to our stockholders we will have to consider at some later date the adequacy of both wages and steel prices under the existing condition.

Exhibit 1

STEEL PRODUCTION AND PERCENTAGE OF CAPACITY OPERATED FOR UNITED STATES STEEL AND THE IRON AND STEEL INDUSTRY, 1935-47
(Net Tons in Thousands)

Year	United States Steel*		Iron and Steel Industry†	
	Production	Per Cent Capacity Operated	Production	Per Cent Capacity Operated
1935	12,467	40.7	38,183	48.7
1936	18,937	63.4	53,499	68.4
1937	20,756	71.9	56,636	72.5
1938	10,525	36.4	31,751	39.6
1939	17,626	61.0	52,798	64.5
1940	22,934	82.5	66,982	82.1
1941	28,963	96.8	82,839	97.3
1942	30,030	98.1	86,031	96.8
1943	30,540	97.8	88,836	98.1
1944	30,815	94.7	89,641	95.5
1945	26,479	82.0	79,701	83.5
1946	21,287	72.9	66,602	72.5
1947	28,570	96.7		

* Source: *Annual Reports, United States Steel Corporation.*
† Source: *Annual Statistical Reports, American Iron and Steel Institute 1946*

Over the past few weeks our steel-producing subsidiaries have been engaged in negotiations with the United Steelworkers of America (C.I.O.) in connection with the request of the Union for a substantial wage increase. We have told Mr. Philip Murray, President of the Union, that in our judgment the granting by us of such a wage increase will not in the long run bring benefit to anyone, as it will lead to similar substantial wage increases in other industries and to higher prices generally. The reply which we gave yesterday to Mr. Murray was that, in the light of this conviction, we cannot grant his request for a substantial wage increase to our steel workers, as such an increase would make necessary a general advance in our steel prices. We are unwilling so to increase steel prices at this time, as we believe this would be inimicable to the best interests of the nation.

While increases in our prices for certain steel products have been announced from time to time since August 1, 1947, our costs have gone up to a greater extent with the result that the earnings statement of the United States Steel for the first quarter of 1948 to be released next week will show a lower profit for the first quarter of this year than for the first quarter of 1947.

In an endeavor to do what is within our power to assist in halting the upward trend of costs and prices, we have adopted the course which I have outlined. We have not been content just to sit by inactive and hope. We have concluded that definite action on our part is advisable in the way of steel price reduction over a broad field.

Exhibit 2

UNITED STATES STEEL CORPORATION 1940 47

Year	Average No. of Employees	Total Salaries and Wages Paid	Total Assets
1940	254,393	$438,621,292	$1,854,585,741
1941	304,248	601,117,053	2,045,021,088
1942	335,866	738,441,000	2,123,435,264
1943	340,498	869,298,853	2,106,062,160
1944	314,888	914,341,158	2,082,371,183
1945	279,274	786,721,918	1,890,768,775
1946	266,835	694,258,248	2,003,517,407
1947	286,316	872,406,549	2,162,612,007

Year	Net Income after Taxes	Earnings per Common Share	Dividends per Share	Average No. Hours Worked per Week
1940	$102,211,283	$ 8.81	3.00	36.7
1941	116,171,175	10.45	4.00	38.1
1942	71,248,500*	5.20*	4.00	38.8
1943	62,631,712*	4.30*	4.00	42.2
1944	60,791,281	4.06	4.00	44.2
1945	58,015,056	3.77	4.00	42.0
1946	88,622,475	7.28	4.00	35.0
1947	127,098,148		5.25	38.5

* After renegotiation.

Source: *Moody's Industrials. Annual Reports. United States Steel Corporation.*

Average straight-time hourly earnings of our steel workers were 83.9 cents in 1940. In February, 1948, their average straight-time hourly earnings were $1.454, an increase of 73.3% over those in 1940. Their actual average hourly earnings were $1.55 in February, 1948, as compared with 85.5 cents in 1940, an advance of 81.3% since 1940. Actual average weekly earnings of our steel workers advanced 91.7% between 1940 and February, 1948, namely, from $31.38 to $60.14 a week. These advances in average straight-time and actual hourly earnings and in actual average weekly earnings between 1940 and February 1948, are substantially in excess of the increase in the cost-of-living during that period. The index of the Bureau of Labor Statistics of the U.S. Department of Labor records an increase of 67.2% in the cost-of-living between 1940 and February 1948.

Exhibit 3

WAGE RATE ADJUSTMENTS AND COMMON LABOR WAGE RATES FOR PITTSBURGH DISTRICT OF THE IRON AND STEEL INDUSTRY FOR SELECTED DATES

Date	General Wage Increase (Cents per Hour)	New Common Labor Wage Rate (Cents per Hour)
April 1, 1934		47.0
November 16, 1936	5.0	52.5
March 1, 1937	10.0	62.5
April 1, 1941	10.0	72.5
February 15, 1942	5.5	78.0
February 16, 1946	18.5	96.5
April 1, 1947	12.5	109.0
April 30, 1948	Increase denied	109.0

Source: American Iron and Steel Institute.

Exhibit 4

AVERAGE PRICE OF STEEL AT PITTSBURGH, SELECTED COST-OF-LIVING INDEX, 1937–47
(Per 100 Pounds)

Year	Structural Shapes	Steel Plates	Steel Bars	Hot Rolled Strip	Cold Rolled Strip	Cost-of-Living Index (1935–39 = 100)
1937	$2.21	$2.21	$2.40	$2.35	$3.14	102.7
1938	2.17	2.17	2.35	2.25	3.05	100.8
1939	2.10	2.10	2.19	2.06	2.86	99.4
1940	2.10	2.10	2.15	2.09	2.79	100.2
1941	2.10	2.10	2.15	2.10	2.80	105.2
1942	2.10	2.10	2.15	2.10	2.80	116.5
1943	2.10	2.10	2.15	2.10	2.80	123.6
1944	2.10	2.10	2.15	2.10	2.80	125.5
1945	2.10	2.21	2.21	2.10	2.80	128.4
1946	2.32	2.47	2.43	2.33	3.03	139.3
1947						159.2
1948						
January						168.8
February						167.5
March						166.9
April						169.3

Source: *Annual Statistical Reports, American Iron and Steel Institute, 1947; Cost of Living Index* (Bureau of Labor Statistics).

According to the Bureau of Labor Statistics, hourly wages in the steel industry at the end of 1947 were 19% higher than in all manufacturing industries, 12% higher than in all durable goods industries, and 27% higher than in all non-durable goods industries.

Exhibits 1, 2, 3, and 4 show the progress in the United States Steel Company and the iron and steel industry as well as other pertinent data. The request of the United Steelworkers of America for a wage increase, dated April 5, 1948, was denied.

QUESTIONS

1. Should the United States Steel Company have granted a wage increase at this time?
2. What is the relationship between wage rates and the cost-of-living index?

Part VIII

PUBLIC POLICY AND THE FIRM

IN PRECEDING SECTIONS we have focused attention upon the behavior of one economic aspect of the firm, such as demand or costs, while the remainder, such as size of firm, channels of distribution, legal framework of society, etc., were considered constant. In this section we assume that all economic relationships of the firm are variable. The use of government regulation and court decisions is taken as a basis for this shift in emphasis because their impact is usually such as to cause review of the over-all position of the firm.

Upon the assumption that a firm is maximizing profit under its existing economic organization and business practices (although such is not always the actual case, since a regulation or court decree may serve merely to prod the inertia of management), any modification of organization or practices means that the firm must make some adjustments in order to maximize its profits under the new conditions. This may mean a review of the entire organization of the firm as concerns the methods by which the various functions of sales, production, finance, price policy, scale of operations, and others are performed.

In most of the preceding sections many conditions surrounding the firm, such as method of marketing, size of market, scale of operations, elasticity of demand, and others, were assumed constant while that upon which attention was focused was allowed to vary. Here we wish to bring out some of the economic interrelationships among the various functions of the firm by considering all of them as variable. This means a much broader view of the economic aspects of the firm from the viewpoint of top management. The discussion and cases which follow will, therefore, emphasize this approach.

Types of Public Policy

One of the most important factors affecting business decisions in present-day economic society is public policy as expressed by legislative action and administrative law. Although history is replete with problems of business and government, the past two decades have witnessed an increasing influence of government upon the behavior of businessmen. Public policy affects business behavior in two general ways: first, it creates a political climate or atmosphere which affects the general attitude of businessmen, and, second, the legal machinery of government issues court decisions or administrative rulings which directly affect the conduct of the firm. There is no fine line of distinction between these two types of public policy. They probably blend into each other at various times and under different conditions. The division made here is purely arbitrary for purposes of discussion.

It is difficult to assess the relative importance of these two types of public policy. Both affect the decisions of the businessman, but both are not taken into account in the same manner. The political climate in which business is conducted involves broad considerations which extend beyond the firm itself, while such is not always the case with the second. Many factors affect the political climate. As with economic factors, the businessman must forecast the impact of those factors which affect the future political climate, in order to make current decisions. Sometimes businessmen think there is an "antibusiness" attitude on the part of government, a condition when there is somewhat of a feeling of mutual distrust between government and businessmen in general. On other occasions the opposite situation may prevail, while, again, something of a mixed feeling may exist which increases the uncertainties in forecasting the future political climate.

There is, for example, proposed legislation to amend Section 7 of the Clayton Act which would forbid the acquisition of the assets of a competing firm where the effect is to lessen competition. This proposal has been introduced into the Congress on several occasions in the past but to date has been passed only by the House of Representatives. Should the Senate approve of the House action and the bill be signed by the President, it would mean that the purchase of the assets of a competitor, in the future, would probably require the approval of the Federal Trade Commission. If a firm is anticipating the purchase of the assets of a competitor, the status of this legislation may affect the timing of the move by the firm. Whether to make the purchase now or at sometime in the future depends upon the possible passage or defeat of this legislation, which would modify the political climate accordingly; for it is a costly proposition to hire legal counsel and prepare briefs for presentation before a government agency. In addition, the time of the executive officers may be required, during which time they are unable to devote their time and energies to the administration of other matters of the firm. The businessman must weigh these matters against his predictions of the future climate in reaching a decision as to what action he will undertake today.

A more general, but perhaps equally important, factor is the expected future fiscal policy of the government. With the exception of two years, the federal government operated from 1932 to 1950 with a Treasury deficit. The result of such experience is evidenced by the size of the public debt. To many businessmen the size of the present debt is an unhealthy situation, and the future fiscal policy of the government enters more and more into their future calculations. If it is expected that the government will continue the policy of deficit spending for the next several years, the influence of such a policy upon the price level becomes important to the future business policy of the firm. Business investment of a long-term nature involves the assumption of fixed costs for a considerable period into the future. The price level and volume of output must be considered by the businessman, and the value he places upon these are affected by his attitude as concerns the fiscal policy of the government. While the businessman cannot place a specific numerical value upon this type of public policy, as he does the price of labor and materials, his attitude toward the future is nevertheless affected by them.

Public policy of the second type may be translated more directly into action by the businessman. There is hardly an area of his operations in which he is not confronted with considerations of laws or regulations which affect his decisions. Especially in the areas of taxes, price policy and competition, labor relations, advertising, and finance he faces some rather complex situations which affect the welfare of his business. The framework of legislative and administrative law within which business activity is conducted is in a process of continuous revision. Almost any alteration in this framework causes the businessman to modify his calculations so as to maximize his profits under the new legal requirements.

In many respects the economic behavior of the businessman is similar to that of the players on a football field. On the field the players are expected to perform according to the prescribed rules of the game, and any observable infraction is followed by a penalty. As the rules of the game are revised, the players concentrate their efforts toward winning within the framework of the new rules, and the conduct of the game is modified accordingly. On occasion the new rules may so modify the conduct of the game that both participants and spectators lose their zest for the sport. So it is with business and public policy. As public policy brings forth new regulations, the businessman attempts, within the new framework, to maximize his profits or, perhaps, withdraws from the particular pursuit in which he is engaged. A concrete example of the latter is the case of a firm which has engaged in the sale of alcoholic beverages under a license from a political unit to do so, but subsequently the citizens of that unit elect to ban the sale of such beverages. The firm must either cease operations or attempt bootleg operations, the latter being an attempt to maximize profits under the new conditions, even though such action is illegal.

The administration of a business firm involves the processes of production, finance, marketing and distribution, pricing, and industrial relations, in addition to many others. Public policy, in general, is not directed toward the elimination of any of these activities but primarily toward the manner in which they are carried on. For example, when a particular firm is advertising its products, it may be making statements of questionable support. To the extent that these statements are accepted by the consuming public and acted upon in good faith, that firm will obtain an advantage over competing firms whose advertising is less exaggerated. The Federal Trade Commission may issue a "cease and desist" order on the grounds that such advertising is misleading. This does not mean that the marketing function is ruled out but that the means of bringing the product to the attention of potential consumers must be modified.

On occasion the law may require the cessation of a practice which has long prevailed, such as the use of a basing-point system of pricing by the steel and cement industries. This practice was recently declared illegal by the Supreme Court, so that the industries concerned have had to reconsider their pricing policies. Again, it does not mean that the industry must stop charging the same price as a competitor but that the method of determining the price must be modified to conform with the court decision. This means that the management in each firm must devise a new pricing policy which will maximize its profits in view of the changed competitive position as a result of the legal decision.

No attempt will be made here to defend or justify any particular legislative act or administrative ruling but rather to indicate their effect upon the behavior of the businessman. This is not to infer that the advocacy of certain legislative action by the businessman is of no importance. Indeed, the maintenance of a political climate in which business may be conducted with a minimum of friction and restriction calls for the contribution of ideas and suggestions by the businessman. He should, however, be ever-ready to defend his position on the basis of a contribution toward the gain of society as a whole rather than on purely selfish grounds which would enhance his own position at the expense of others. This is not to infer that the latter course has never been followed. Antichain-store legislation promoted by independent grocers is an example of a successful undertaking of this sort. It is to be hoped that the ingenuity of the student will be put to a rigorous test in meeting the problems and restrictions imposed upon business conduct by law but that such proposals as he makes will be within the realm of ethical behavior and legal restraint. What we are primarily interested in is the adjustment of the firm to regulations imposed by public policy through considerations of other alternatives in the performance of the functions of administration of a business firm so as to maximize profits.

TAXES

The two types of taxes with which businessmen are primarily concerned are excise and income taxes. For purposes of classification, a general sales tax will be considered as a broad form of excise taxation. In addition to these two forms of taxation, taxes which are levied with the intention of restricting or prohibiting certain forms of economic activity also concern the businessman. In this category fall such taxes as protective tariffs and taxes which are levied on specific commodities which discourage their use, such as the recently repealed federal tax on colored oleomargarine. In a sense these latter two taxes are a form of excise tax but for purposes of identification and distinction are not always classed as such.

Excise Taxes

Excise taxes are levied by both the federal and state governments on many commodities, such as gasoline, tobacco, furs, transportation, automobiles, and many others, both luxury and nonluxury.

To the producer and seller of any article which is subject to an excise tax, both the rate and the manner in which the tax is levied are important. Some excises are levied on the money value of the commodity, such as the current 20 per cent levy on the retail selling price of fur coats, while others are levied on a physical unit basis, such as the federal and state tax on gasoline and cigarettes. Gasoline is usually taxed at some absolute amount per gallon. Cigarettes are taxed according to the number of cigarettes per package within a maximum weight.

Among the proposals before Congress is one which would change the basis for levying taxes upon cigarettes. It has been argued that "economy" brand cigarettes, those retailing for several cents less per pack than the leading brands, pay the same absolute amount of tax per package as the higher-priced brands, so that the rate of taxation is inequitable on a value basis. If the rate were levied according to the selling price, then the tax would be more proportional. To the extent that such a change in the method of assessment affects the selling price, these arises in the mind of the cigarette manufacturer the question as to how it will affect his sales. Will it mean that the selling price of the "economy" brands will be reduced? If so, to what extent? A partial or the full amount of the tax reduction per package? What effect will this have upon the sales of the leading brands because of the increased differential in price?

The last question brings us face to face with the elasticity of demand for a commodity—in this case, cigarettes. If we assume that the demand for cigarettes as a whole is inelastic but that the demand for various brands of cigarettes has a price elasticity greater than unity, then the producer and seller of "economy" brand cigarettes will probably reduce the selling price by the full amount of the tax reduction. On the other hand, if the price elasticity of demand is less than unity, then it will be more profitable not to reduce the selling price by the full amount of the tax reduction. If the demand is very inelastic for the "economy" brand producer and seller, he will not reduce the price at all but will show a larger margin of profit per package at the same price which prevailed prior to the tax reduction.[1] The foregoing is based upon the assumption that the selling price of the leading brands remains unchanged after the modification of the tax laws.

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[1] Even in this case there may be a reduction in price if the increased margin would result in profits so high as to attract new producers into the field.

From the viewpoint of the producer and seller of a leading brand of cigarette, similar calculations must be made concerning his price elasticity of demand. If the amount of tax per package remains unchanged under the new law and there is a price elasticity of demand for his brand, he may also consider a price change, depending on what price changes the sellers of the "economy" brands introduce. If the "economy" brands reduce their prices and widen the differential between their prices and those of the leading brands, so that the sales of the leading brands are affected, then the seller of the latter will find it to his advantage to reduce his prices also. All his price reduction, however, will not be charged to a reduction in the margin of profit per package, since, with a lower price, under the new tax law part of the reduction will be a reduction in the amount of tax per package. In the case we have assumed here, that of price inelasticity of demand for cigarettes as a whole but of price elasticity between brands, the reactions of competitors to price changes becomes extremely important. The reduction of price by the "economy" brands by the amount of the tax reduction may cause the producers of the leading brands to reduce their prices proportionately, thus maintaining the same price differential as existed before the tax reduction. This could result in the same division of the market among sellers as before the tax change but with lower cigarette prices for the consumer. The possibility of such action may deter the producers and sellers of "economy" brands from making such a price cut.

The reduction in price of the "economy" brands may be met in another manner by the producers of the leading brands. They may decide to enter the "economy" market with a low-priced brand of their own rather than suffer a price reduction on the leading brands. This may be a method of maximizing profits on the part of the producers of the leading brands. Assuming that the demand curve for the leading brand of a particular producer is of less than unit elasticity, he may earn larger profits by maintaining the price on the leading brand and offer an "economy" brand at a price equal to that of similar brands, thus utilizing the capacity of his plant between the two brands. The profitability of this arrangement, however, would depend upon the cost structure of the individual producer and the division of the output between the two brands. The elasticity of demand for the two brands depends upon consumer loyalty to the particular brands. This is something the producer must either estimate or learn through the experience of price variation. The latter may not be feasible, however, because of the oligopolistic nature of the cigarette industry.

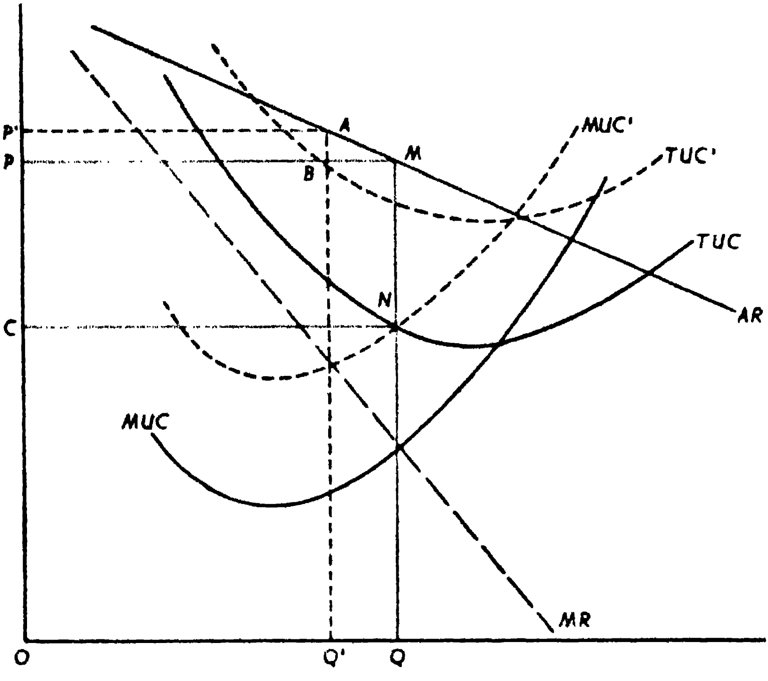
The imposition of a new tax or the removal of an old excise tax affects the firm in a manner similar to the modification of an excise tax. The businessman would prefer to be able to pass on the full amount of any excise imposed upon his product without a diminution of sales. Two problems of elasticity of demand are concerned in this case: the elasticity of demand for the industry as a whole and the elasticity of demand for an individual firm within the industry.

Suppose a tax is to be levied upon deep-freeze units for both domestic and commercial use. If the tax is passed on by all producers of such units direct to the purchasers of this product, the price is increased by the amount of the tax. In the case of a potential purchaser of a deep-freeze unit, the increase in price may cause him to refrain from purchasing and, instead, make use of a rental deep-freeze locker in a publicly operated deep-freeze storage unit, assuming one is available. Or he may prefer to dispense with a deep-freeze unit entirely and continue to buy or pack frozen goods in quantities small enough to handle in the freezing unit of his refrigerator. This would indicate some degree of elasticity in the over-all demand for deep-freeze units. If the demand is quite elastic, the addition of the total amount of the tax may cause a reduction of sales in the industry. The over-all elasticity of demand for this product would depend upon the alternatives open to the potential purchaser for the preservation of food by other means.

In the case of the individual firm the addition of the full amount of the tax depends upon the elasticity of demand for that particular firm. Let us suppose that the industry adopts the practice of quoting prices including the tax, so that the price tag shows the retail price plus the tax in a single amount. This does not mean that all firms in the industry will merely add the amount of the tax to the existing price for the product. The problem for the individual producer or seller is whether or not he will make a price adjustment because of the tax. For the retailer this problem is further complicated if the producers of deep-freeze units have adopted so-called "fair-trade" prices, i.e., the price to the purchaser is fixed by the producer, and when subsequently sold to the purchaser by the retailer that is the price to be charged. The demand curve of the retailer may be quite different from that of the producer. From both the producers' and the sellers' viewpoints the greater the number of available substitutes for deep-freeze units, the more elastic the demand curve for the industry; and the greater the number of producers of deep-freeze units in the industry, the more elastic the curve for any one individual producer. Where an industry is highly oligopolistic with an inelastic demand curve for the industry, the tax may be more easily passed on to the consumer of the product. Where the industry is highly oligopolistic but with an elastic demand curve, there may be obstacles to the passing-on of the tax in its entirety.

Exhibit 1

SHORT-RUN EFFECTS OF EXCISE TAX ON PRICE AND OUTPUT



The short-run effect of an excise tax upon a firm in a monopolistic position may be illustrated graphically as shown in Exhibit 1. In a position of equilibrium the firm would be maximizing profits by producing output *OQ* and charging price *OP*. The imposition of an excise tax would mean that the cost of selling the product would be increased by the amount of the tax. That is to say, for every unit sold, the seller must remit to the tax collector the amount required by law whether he actually collects it or not. Presumably, he wishes to collect the full amount of the tax. The addition of the tax raises his cost per unit, as shown by the new total unit cost curve *TUC′* and marginal unit cost curve *MUC′*, compared to the original curves *TUC* and *MUC*, respectively. In order to maximize profits under this new cost structure, the firm will reduce output to *OQ′* and charge price *OP′*. While the firm is selling fewer units, it is charging a higher price in the amount of *PP′* on each unit sold. This means that, because of the tax levied upon the producer, the price has been raised to the consumer. However, the firm has not been able to pass along the entire amount of the tax because the total profits of the firm under the new cost structure are represented by the rectangle *PBAP′*, whereas before the tax they amounted to *MNCP*, which is much larger. Had the firm been able to pass along the entire amount of the tax, profits would not have been reduced. If the firm decided to absorb all the tax, profits would be even less than represented by rectangle *PBAP′*. In the case shown, the seller must absorb part of the tax.

The level to which price will be raised and the tax passed on to a greater degree depends upon the elasticity of demand and upon the shape of the relevant cost curves. The long-run effects of the incidence of the tax depend upon a number of factors which will not be discussed here. We wish to emphasize here that the firm will not always find it most profitable to assume that it may either pass on an excise tax in its entirety to the purchaser or improve its position by complete absorption of the tax.

Income Taxes

The effect of an income tax upon the behavior of the businessman is somewhat less direct than that of an excise tax. While the excise tax is a levy which must be paid for each unit produced and sold, the income tax is not levied unless a prescribed minimum profit results from business operations. A certain percentage of profit above a stated minimum is paid to the tax collector according to the prescriptions of the current income tax laws. In a sense this is a sharing of the profits of the business firm with the community through the tax-collection agency. As pointed out in Part I,[2] profit computed for purposes of taxation is not the same as economic profit or profit in the businessman's meaning. Since no tax is paid unless a profit of a certain amount is exceeded, the definition of profit for tax purposes (income) becomes of paramount importance. To repeat again, since profit is defined to a considerable extent by the definition of cost, which is deductable from income, a great deal of the income tax laws deal with allowable costs of carrying on business.

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[2] See p. 6.

Among the more important definitions of cost of operations are those of depreciation and depletion, inventory valuation, capital versus revenue expenditure, interest, and various contingency reserves. Any modification in the legal definition or interpretation of these items means a corresponding variation in the amount of net profit for tax purposes. It is not only the current definition of these costs which are important to the businessman but expected changes which may be made in them either by legislative action or by judicial interpretation. In conjunction with expected changes in the definition of cost (profit) are expected changes in the rate of taxation and the tax base. These considerations enter into the businessman's calculations of the future and affect business policy. This policy affects not only the volume of future business activity but also its timing.

Expected changes in the law may cause a shift in the timing of certain business decisions or possibly the execution of decisions previously made. An expected change in the allowable rate of depreciation may cause a capital investment to be made earlier than was originally planned or the postponement or cancellation of plans already made. A change in the allowable rate of depreciation or depletion may make profitable an investment which ranked as unprofitable under the old rate. The higher the rate of depreciation, the lower the stated net profit. Since deductions from revenue for depreciation are charges against income rather than a payment outside the firm, it means that the higher rate of depreciation permits a firm to retain more of its receipts. These receipts are not necessarily kept in cash but may be invested in inventory or used to finance new capital investment. It also means a reduction in tax liability, which also increases the net worth of the firm for a given revenue.

An experience of this nature was witnessed in the United States during the recent war, when firms purchasing new equipment for the express purpose of manufacturing war matériel were permitted to write off such investment at a much more rapid rate than normally. The result of such a policy on the part of the government was to induce businessmen to expand war production much more rapidly. The same principle applies in peacetime. Especially may this be true in the case of new firms whose resources are extremely limited so that there is a need to build up a reserve as rapidly as possible. The writing-off of a major portion of the capital expenses in the early life of a new firm, as contrasted to a much lower rate of amortization required by law, may be the difference between abandonment of the venture and the decision to undertake the risk. This is the argument frequently advanced to encourage the growth of new enterprise. In addition, it is suggested that so-called "new businesses" be given a much lower rate of taxation for some specific period until they are able to maintain themselves and pay the regular rate. Should such legislation be approved, it would perhaps affect the method of expansion of old firms as well as new. An old firm, instead of expanding its operations under its existing corporate structure, might organize a new corporation to cover some specific expansion, such as the addition of a new product to its line, in order to obtain the tax advantage and thus maximize profits. This assumes that the law is so drafted as to define a firm and a corporation as synonymous.

Depletion allowances for the purpose of computing net income also affect the development of the mineral industries. The sinking of an oil well, for example, involves considerable risk, chiefly that the well may turn out to be a dry hole. Even if the well produces, the amount it will produce over its lifetime is unknown, so that the risks undertaken in oil-well drilling call for considerable investment, which the owner wishes to recover as rapidly as possible. If the rate of allowable depletion is low for tax purposes, the net income after taxes may be so small as to discourage the quest for new wells, particularly on the part of small prospectors who operate on a "shoestring" basis. For a mining firm already in existence a change in the rate of depletion will not have the same effect upon its operations as it will upon contemplated new mining operations. The effect of a change in the depletion allowances will modify the profits from a given revenue accordingly. Whether or not it will cause an existing mining firm to close is another matter, since the allowances for depletion are not used to replace capital in the form of natural resources in the same sense that a manufacturing firm replaces its capital tools, plant, and equipment. Therefore, a rate of depletion which is proportionately reduced, as are depreciation rates for other capital assets, does not make the mining firm unprofitable in the sense that it would a manufacturing firm which may be able to dispose of its assets for alternative uses. Natural resources are not mobile, nor can they be created; hence there may be a tendency to work them until they are physically depleted, once the investment is made, regardless of the depletion allowances.

The method of inventory valuation for the purpose of making up a statement of profit and loss is also affected by tax laws. Inventory which is accumulated over the income period is ordinarily purchased at varying prices. Some of the inventory which is on hand at the close of the period probably was purchased at different prices. If prices are rising and the inventory is valued at the lower price, the profits of the firm will include gains other than from manufacturing and selling operations. If the firm wished to keep its taxable income at the lowest possible figure, then it would value the inventory at the higher current market prices. This would reduce the tax liability on a given revenue. If the inventory were valued at its original cost, then the profits of the firm would be higher and a higher tax liability would be incurred. The businessman is not, however, at liberty to make use of these alternative valuations at his pleasure for tax purposes. The income tax laws have imposed some limitations upon his actions in this respect.

Many firms make use of inventory systems known as "FIFO"—first in, first out—and "LIFO"—last in, first out—as a method of inventory valuation. Under the first method, when finished goods are sold or a withdrawal is made from inventory for sale without further processing (as in the case of a retail store), the cost of the inventory is calculated at the price paid for the oldest inventory on hand, i.e., the first in stock. This means that in a period of rising prices the profits of the firm will be stated at a higher figure than if market price of inventory were used as cost of goods sold. The reverse would be the case in a period of falling prices. Under the second method, LIFO, the cost of goods sold is calculated as the price paid for the most recent addition to inventory, so that cost of goods sold will reflect higher costs in a period of rising prices. In a period of falling prices the effect will be just the opposite. Depending upon the phase of the business cycle, one system will obtain an advantage over the other. There may be reason, from the tax viewpoint, to change from one method of inventory valuation to the other. This calls for a forecast of the future trend of prices as it concerns the business firm involved. Furthermore, in most cases it requires permission of the Commissioner of Internal Revenue to shift from one method to another. In spite of the required permission, it is to the businessman's advantage to investigate the tax liability under the two methods as business conditions change, in order to keep his tax liability at a minimum.

Under present tax law one of the most important provisions is that which permits the interest on collateral and debenture bonds to be deducted as a business expense, while dividends upon preferred and common stock are not so considered. This provision affects business decisions as to methods of financing, i.e., the type of security which the firm may offer for sale to raise more funds. For example, assume that an industrial corporation is in need of additional funds for working capital and expansion. Also assume, as far as the security market is concerned, that the record of earnings of the firm has been such that it could market with equal facility either stocks or bonds. With given expected revenues from additional working capital and additional capital investment, the firm, if it issued bonds, could deduct the amount of interest paid as a business expense and thus lower its tax liability. If, on the other hand, it financed through stocks, the amount which would have been paid as interest on bonds is not deductible. Therefore, the income of the firm would be higher, which would increase its tax liability, especially if the amount were of sufficient size to place the firm in a much higher surtax or excess profits tax bracket. It is not meant to convey the idea here that tax considerations are the only basis for offering one kind of security rather than another. Of equal importance is a forecast of expected future business conditions. If a firm assumes a fixed obligation in the form of bonds, it must anticipate that price and volume of output will not fluctuate to such a degree that it will impair the firm's ability to meet the fixed charges incurred. There is also the attitude of the security market toward stocks and bonds at the time the issue is expected to be offered. The premium or discount which may attach itself to one or the other of the types of securities will, in all probability, affect the type of security the firm may attempt to market. Our purpose here is to emphasize the role that the tax laws may play in influencing business decisions so as to maximize profit within the framework of existing tax law.

PRICE POLICY AND COMPETITION

While price policy and competition are not the same thing, they are so closely associated with each other that they will be discussed jointly. Only a few of the high spots covering public policy toward pricing and competition will be undertaken. Generally speaking, the businessman is limited in the arena of price policy only by the interaction of demand and supply in the market. That is to say, he is free to charge as high a price as the traffic will bear or sell his product at as low a price as he chooses. On occasion, however, the pursuit of either or both of these two extremes in pricing attracts the criticism and scrutiny of the public, and demands are made upon government, by affected groups, to do something about the pricing methods of a particular firm or industry. On the one hand, the clamor for some regulation of prices is associated with the monopolistic position of a firm or industry, while, on the other, the demand for price regulation arises because of too much or "cutthroat" competition.

Legal Regulation of Price Policy

With the exception of common carriers and government-operated enterprises, the federal government has engaged in little or no direct price fixing other than in times of war emergency. Almost all the regulations concerning price policy have emerged from decisions of courts and administrative agencies, chiefly the Federal Trade Commission. This means that all such decisions are the result of a challenge of the pricing practices of firms by the government agency concerned. Thus, there is an element of uncertainty as to the legality of certain pricing practices of business, and the status of such practices can be determined only by making an issue of the practice and testing it in the courts. Thus it is possible that practices which have prevailed for years and been acceptable to society may, because of changing attitudes and dynamic change, be challenged. Where such action occurs and the pricing practice is modified or forbidden entirely, it calls for a compliance with the court decree to the extent ordered. On the assumption that the pricing methods before being challenged were so organized as to maximize profits, the businessman must reappraise his price policy so as to conform to the law and at the same time maximize his profits within the new limitations. On occasion this may mean quite an upheaval in long-established methods of distribution and production, while in others it may be less serious. In cases where a given price policy is declared illegal, the court opinion usually does not provide alternative policies which the defendant may follow but leaves him to determine for himself a new price policy which he hopes will not bring him again into conflict with the law.

Perhaps the outstanding example of this sort is the recent Supreme Court decision on the basing-point system.[3] Simply stated, a basing-point system is one in which some location is chosen as a point from which transportation charges are computed to the point of delivery, regardless of the point from which the product is actually shipped. The price is then quoted either f.o.b. the base point or, as is more often the case, the delivered price at destination. Since all producers of the commodity may not be located at the basing point, it means that the net proceeds to the producer after paying freight will not be the same in the case of all sales. The basing-point system, then, is basically one of price discrimination. In the Cement case[4] it was proved to the satisfaction of the court that these identical delivered prices were the result of collusion among producers, but it does not necessarily follow that all delivered pricing systems are based on collusive action. There is still a great deal of confusion in the minds of many businessmen, however, as to what extent a delivered pricing system may be used.

Effects of Legal Restraint on Price Policy

Of concern here is not so much the legality of the basing-point system as it is the effect of a judicial or administrative decree ordering a modification of the system. The abandonment of the basing-point system of pricing is not simply one of changing price policy to f.o.b. mill as a permanent solution. Such a step may provide an immediate compliance with the legal requirements, but it does not solve the economic problem of the firm, namely, the maximization of profit. Indeed, the adoption of an f.o.b. price may result in an unprofitable situation for some firms in the industry affected. Furthermore, the "solution" to the problem may not lie entirely in the field of price administration at all but in the modification of other factors, such as size of plant, location of plant, mode of transportation, size and extent of market, type of product, degree of specialization (or possibility of specialization or integration) of product and operations, relative employment of labor and capital equipment, and many others. Price is affected by cost. That is to say, a product will not be produced in the short run when price fails to cover variable cost, or in the long run when price fails to cover total cost. Cost is affected by volume of output. Within limits, the unit cost of production will decline with an increase in output. But volume of production is governed by the productivity of labor and capital and the size of the market. Price also affects the size of the market, in that a higher price, relative to competitors, reduces the size of the market, while a lower price tends to increase the size of the market.

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[3] *F.T.C. v. The Cement Institute*, 333 U.S. 683 (1948).

[4] *Ibid.*

Price discrimination permits a firm to extend its market and thus lower unit cost of production, so that profit is increased. Where markets are separated by ignorance, legal barrier, or collusion, additional volume can be sold in another market at higher or lower prices than in the existing market. The seller then has the advantage of producing additional units at decreasing marginal cost, provided that he is operating within that particular range on his cost curve. This permits the acceptance of a lower price than he would be willing to accept if he priced all units on the basis of marginal cost relative to production for the existing market.[3] Where such pricing practices exist without interference for long periods of time, it may cause plant capacity to increase. Locational factors appear to be of less importance and transportation of finished products becomes more important than that of raw materials. When price discrimination is eliminated or modified by legal decree or removal of barriers separating the markets, the firm is forced to make some adjustments. Therefore, considerations other than the mere changing of the method of quoting price must enter the calculations of the firm if it is to maximize profits or minimize losses. It may be necessary to revamp the entire method of production and distribution.

If the result of the elimination of price discrimination is to contract the size of the market for the firm, it must consider the reduction in output and the subsequent effect upon unit cost. The businessman may wish to revise upward his price in the local market if his unit cost rises and the demand curve is of sufficient inelasticity. The result of the elimination of price discrimination may have considerable effect upon the shape as well as the position of his own demand curve. This will probably affect his volume of output and, in the long run, his price. It may also be possible to relocate part of his plant so as to reduce capacity in his local market and place him in a more competitive position in more distant markets which he formerly served through price discrimination. There is also the possibility of differentiating his product so that he may command a higher price for it in both local and distant markets in order to keep his volume high and unit cost as low as possible. Where the market for his product is curtailed by the restriction of price discrimination, the businessman may consider the addition of other products to his line when the market and technicalities of production will permit. In any event, the adjustment is not confined merely to the sphere in which the restriction arose. The entire perspective of the firm may change because of the modification in price policy.

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[3] If the firm is able to obtain a higher price than exists in the present market, the increased volume not only decreases unit cost but also increases the margin of profit per unit because of increase in marginal revenue.

Resale Price Maintenance

All but three of the states in the United States have statutes which permit the fixing of resale prices by the manufacturer of branded products. Such laws affect the price policy of many firms. For the producer it affords some degree of price control over the sale of his product to the final consumer. In effect, it permits the manufacturer to set the margin for those firms intermediate in the distribution process, such as wholesalers and jobbers. The laws permit vertical price agreements under certain conditions, and, while no specific penalties are established for failure to adhere to the terms of these agreements, the producer of the branded article may bring suit in state courts to enforce such agreements.

Where the retailer is free to charge whatever price he chooses for the products he sells, the amount of his margin is his personal choice. He may reduce prices to attract customers to his place of business. By accepting a reduced margin on the cut-price merchandise, he may hope to sell other products on which there has been no price reduction. Under such conditions price competition is not subject to control by any other than the retailer.

If the producer of a branded commodity feels that frequent and large price changes are detrimental to his operations, he may enter into a resale price agreement and prevent further price cutting by retailers. Where retailers are numerous and the product concerned is one which attracts a large number of buyers by sharp price reductions, competition in that article may reach a cutthroat stage. As demand for the product fluctuates from frequent price changes, it may affect the rate of production of the producer to such an extent that he finds his costs reflecting the situation. If the result of price wars in his product are such that the demand from retailers is erratic, he may find his production schedule on a "feast or famine" basis, or he must carry a sufficiently large inventory so as to meet sudden changes in demand. These factors increase risks and thus costs.

If the producer is engaged in the manufacture of a product in which there are relatively few manufacturers, so that competition at the productive level is highly monopolistic or oligopolistic, he will find it to his advantage to transfer price competition from the retail level to the manufacturing level, where price policy will perhaps follow a much more stable pattern of behavior than at the retail level. Stabilization of price will tend to eliminate the changes in rate of sales and production due to movements of price up and down the demand curve, but it will not eliminate changes in output responding to shifts in the demand curve. The foregoing is based upon the assumption that the retailer will abide by the provisions of the resale price contracts and charge the established price at all times. This eliminates price competition at the retail level in the sales of the product of one manufacturer by several retail outlets. To the extent that competing products enjoy price stability by similar means at the retail level, price competition in the industry is substantially arrested.

The coin of resale price maintenance appears to have two sides, however. When the rate of production and consumption are about the same so that there is no pressure on price at the retail level, price-maintenance contracts appear to work fairly well. When, on the other hand, there is required considerable sales effort to keep an item moving, there is a temptation to shade price in order to maintain or increase sales. Enforcement then becomes difficult.

In the case of some particular products, such as some of the durable goods, price cutting may develop on a large scale. Frequently this results in a demand upon the producer by retailers who adhere to the contract price to take action against the violators of the contract. Such a step may mean the loss of large outlets by the producer, and he finds himself in somewhat of a dilemma. If competition is of a highly monopolistic or oligopolistic nature at the productive level, he probably will find that his competitors are in a similar position, so that a reduction of prices at the manufacturers' level may accomplish little, since any reduction may bring forth a similar reduction by his competitors. The producer may take no action whatever and tacitly give a nod to those retailers who adhere to the resale price to make reductions themselves and thus shift the initiative of a price cut from his own competitive level to the retail level.

But this may not work out to his long-run advantage. If the result is a general price reduction at the retail level, there will probably arise some pressure from retailers to re-establish the margin of profit which existed under the resale price and then the problem of price reduction is forced back to the level of the manufacturer. If he fails to do this, he may find that the retailers will tend to push the sale of competing products on which there is a higher margin. If the producer's industry is one in which there is a price leader and the particular producer under pressure is not the leader, he finds his position more perilous. In such a situation it may behoove him to attempt to shift emphasis from price competition to some other characteristic of competition, a move which may prove rather expensive.

Resale price maintenance is not a panacea for cutthroat competition at the retail level for any particular manufacturer. While it has both advantages and disadvantages, the businessman would do well to proceed with caution in taking advantage of the legal provisions for the regulation of price. In the case of firms serving a national market, there is a possibility that competition among retailers in their respective products may be eliminated by the organization of a retail distributive group of their own. This has been done by several of the office machine manufacturers and some of the gasoline refining companies. There are also some mixed organizations, that is, the use of factory branches in areas large enough to support such an outlet and the use of independent outlets in market areas too small or scattered to warrant the establishment of a factory branch. If on a sufficient scale, the factory branches may be able to police price competition among the independent outlets through price leadership. Such organizations, however, require considerable capital investment and a complex system of management and control. Independent outlets assist the producer in carrying inventory, while a wholly-owned distributive organization places this burden upon the producer.

Public Regulation of Competition

The integration of production and distribution introduces another problem of competition which is affected by public policy. This is the control of monopoly. No discussion of the Sherman Act and its amendments will be undertaken here, other than to point out that the interpretations of the law are not clear. Whether or not a particular move by a firm tends toward monopoly in the legal sense is a matter for the firm to take up with legal counsel. Within the limits of the law the economics of the firm will be adjusted accordingly. Acts which are forbidden may raise the costs of the firm and thus reflect higher prices, while permissible acts may have the opposite effects.

When a firm is in the process of growth, many opportunities for economies arise. A firm which originally engaged in the productive stage alone may discover some method of increasing its output considerably. Before the production is actually undertaken, some means of marketing the increased output must be found. Possibly an advertising campaign, coupled with education of dealers and retailers, will accomplish the job. In another situation it may be feasible to set up an organization in the form of a division or subsidiary to take over the entire marketing process. This may be done in several ways.

The firm may set out to organize its marketing division from scratch. Such a step is expensive and requires a long period of time. A much more rapid and frequently less expensive method is to acquire an organization in the field which is a going concern. This may be done by merger, purchase, or contract. Such a step usually requires some reorganization, however, since the newly acquired firm has not necessarily been so set up as to be able immediately to specialize in the distribution of the products of one particular manufacturer. In any event, there arises the question as to whether or not such a step suppresses competition so that the law is violated. Under our system of law the consolidation is usually an accomplished fact before legal action begins, so that a dissolution is a costly process.

The motive for expansion may operate in another direction. A given firm may find that it could sell more of its product if it were able to produce it. It could expand by building additional plant and equipment, but that also requires time. The acquisition of a supplier or a competitor is more rapid and again may be less expensive. But here, again, the businessman is confronted with the law. In this same instance the acquisition of a competitor may bring about lower unit cost and hence permit a better competitive position when the acquisition is completed. If such economies were the motive but the consolidation were forbidden by law, the firm would not then be able to lower costs in that manner. In such a case the firm, if it insists upon expanding, will be forced to seek some other method of doing so, such as building new plant and equipment.

There is also the motive mentioned earlier, that of acquiring a supplier in order to reduce the price paid for raw or semiprocessed materials. A firm may be purchasing such materials from another firm. If this item is a substantial element of cost and the firm is not able to obtain it at a lower price elsewhere, it may enhance its profits by acquiring the firm which supplies this material. The firm would then be able to supply itself at cost and not pay the margin of profit it formerly paid to the independent supplier. If, however, the acquired firm was also supplying competitors of the firm making the purchase, the newly consolidated firm would find itself both supplying its competitors and competing with them in the market for the finished product. This would give the integrated firm a competitive advantage over the nonintegrated firm in the field, especially if the acquired firm enjoyed a substantial degree of monopolistic competition before being taken over by its former customer. Occasionally the law steps in and sets up requirements governing the price policy of the integrated firm in order to protect competitors from price discrimination. This might affect the economies which the integrated firm hoped to achieve. It also would place this firm on guard against allegations of predatory pricing practices. The firm then would have less freedom in its pricing policies than before.

On the assumption that integration occurs because of the economies of large-scale production and distribution, any legal interference affects the costs and prices of the firms involved so that such economies cannot always be achieved. These interferences will affect the behavior of the firm accordingly and force it to maximize its profits within the limitations set forth. Depending upon the provisions and interpretations of the law, it is sometimes possible to achieve the goals of integration by other means which are within the realm of legality. Where the businessman can present his case to the legislators with sufficient evidence to convince them of the economies involved, he may be able to bring about a change in the legal and political climate in which he operates his business.

LABOR RELATIONS

Every business firm uses labor of some sort. In many cases the labor may consist solely of self-employment, but in a large number of firms labor is hired by oral or written contract. Legal restraint has governed the establishment of these contracts since the beginnings of common law. More recently labor law has been broadened to more than merely protect the contractual rights of the individual worker. With the organization of labor unions and the recognition of collective bargaining, legislation has been approved which sets up a structure in which collective bargaining is to be carried on. As a result, numerous laws and regulations have been passed and issued which affect the actions of the firm. Almost all these requirements have some economic effect upon the firm and affect its policies in many fields.

The right of labor to organize and bargain collectively means that groups of workers may join together and refuse to work under conditions not satisfactory to them. To the extent that the workers are able to keep others from taking their jobs while they refuse to work, they are able to monopolize the supply of labor for the firm by whom they are employed. If the employer accedes to their demands and pays a higher wage or agrees to a reduced number of hours for the same pay, his labor costs rise. If everything else remains unchanged, there will be a reduction in profits. Usually, the businessman seeks some adjustment so as to recover some of these lost profits, if at all possible. Perhaps the most frequent short-run adjustment is an increase in the price of the product, but this is not profitable unless the elasticity of demand or a shifting of the curve upward and to the right permits. The latter is probably more of a long-run phenomenon than the former. Other possible long-run effects are the substitution of machinery or the purchase of more semifinished materials from suppliers whose cost structure permits them to supply it cheaper than the firm itself can semiprocess raw material.

The substitution of machinery for labor may raise some additional problems. Increased use of automatic equipment may be possible only with an increased level of output. This introduces the problem of distribution, which may force the firm to seek a wider market and thus considerably change the organization of the firm. Such a sequence of events will not necessarily follow if the firm is merely prodded into increased use of machinery because of the increase in wages where the machinery would have been more profitable than labor before the wage increase. The union demand or the decision of a fact-finding or arbitration board, in this case, tends to destroy the inertia of a management which failed to maximize profits under former conditions.

Minimum Wage Laws

The effect of legislation establishing minimum wages and maximum hours is similar to an effective demand of a labor union. Legal action, however, is usually applied unilaterally, whereas union action is not, except in the case of industry-wide bargaining. When a minimum wage, in excess of the current wage, is established, the effect upon the individual firm is the same as that of an excise tax applied to physical units, as illustrated in Exhibit 1 (p. 534). The effect is to increase unit cost and thus reduce output and the number of workers employed under the assumptions of the case. With reduced output, the price per unit of product may be increased, depending upon the elasticity of the demand curve, to cover the higher wages. As in the case of excise taxation, there may be little that the firm can do other than to absorb part or all of the increased wage cost if the demand curve is highly elastic. To lower costs further introduces the question of whether larger-scale operations would result in a lowering of the entire cost curve and thus a reduction of unit cost under the minimum wage. Allied with such a decision are problems of marketing, finance, and management.

Industry-Wide Bargaining

Industry-wide bargaining affects the labor costs of the firm similar to minimum-wage legislation. Many labor unions are exerting political pressure to permit and legalize industry-wide bargaining. At present, only the coal industry formally practices industry-wide bargaining, but for practical purposes it exists in other industries. Where there is a dominant firm in the field whose agreements with labor unions are awaited by other firms in the industry together with their respective locals of the unions involved, a "pattern" of labor settlements is reached so that the results approach those of industry-wide bargaining. Where other unions follow the lead of the dominant firm, the wage scale becomes something of a datum to the smaller firms. Their costs are affected accordingly, and adjustments usually come in other phases of economic activity than in the matter of wages and hours alone. Where government supports or fails to forbid industry-wide bargaining, the businessman finds pressure upon him to adjust to such conditions.

Public Settlement of Labor Disputes

Public settlement of labor disputes has increased in recent years. This has had considerable impact upon the labor costs of firms involved in labor disputes. It tends to permit "jockeying for advantage" by both unions and management as to whether or not the dispute should be submitted to fact-finding and public settlement. If management believes that the union demands are excessive and that facts support their position, which calls for a less costly agreement, management may procrastinate in reaching a settlement and tend to force the dispute into the jurisdiction of an *ad hoc* fact-finding board in the hope that the decision will be in its favor. If such a result is achieved, then the economic impact upon the firm will be less. If, on the other hand, the union is of the opinion that the board will support its position rather than that of management, it may also wish to channel the dispute to governmental and legal machinery. Management, in this case, may find it to its advantage to settle the dispute on less stringent terms if the union is agreeable. In short, the less costly method is the course to pursue.

It is under these conditions that the businessman must make an estimate of the political climate. If the government tends to lean more toward support of unions than of management, serious effort should be made to avoid the transfer of the dispute beyond the jurisdiction of the parties involved. Whatever the result, the economic organization of the firm will be affected, and, to the extent that knowledge and ingenuity permit, the businessman is faced with adjustments of various kinds in an effort to maximize his profit to the point of retaining his capital in that business in the long run or prepare to withdraw from activity in that particular field.

SUGGESTED READINGS

Literature in this particular field is practically nonexistent. What little there is has been in the form of case studies of particular firms and has not yet been formally treated as a general subject. The few readings suggested below are more in the nature of allied fields than further reading in the field of "public policy and the firm."

Bowman, M. J., and Bach, G. L. *Economic Analysis and Public Policy*, chap. xxxiii. 2d ed. New York: Prentice-Hall, Inc., 1949. Elementary treatment of problems of regulation of competition, such as price discrimination, patent laws, utility regulation, etc.

Butters, J. K., and Lintner, J. *Effect of Federal Taxes on Growing Enterprises: A Case Study*. Boston, Mass.: Graduate School of Business Administration, Harvard University, 1945. A study of the experiences of two firms during a period of expansion, with emphasis of the effect of tax laws upon decisions of the firm as to methods of financing, excess profits, and retained earnings.

Griffin, C. E. *Enterprise in a Free Society*. Chicago: Richard D. Irwin, Inc., 1949 Chapter xiii deals with the effect of government activity upon business risks and incentives. Chapter xvi treats the problems of tax burdens by the firm and the effect of taxation upon incentives.

Mund, V. A. *Government and Business*. New York: Harper & Bros., 1950. Chapters xvi, xvii, and xviii are concerned with the regulation of competition, with particular reference to the Clayton Act and Robinson-Patman acts. Chapter xxii treats some of the problems of pricing under the state resale price maintenance acts.

Case VIII-1: NATIONAL CARBIDE CORPORATION v. COMMISSIONER OF INTERNAL REVENUE, 366 U.S. 422

Air Reduction Sales Company, Pure Carbonic, Inc., National Carbide Corporation, and Wilson Welder and Metals Company are wholly-owned subsidiaries of Air Reduction Corporation. For the year 1938 these subsidiaries reported income only as stated in their contracts with the parent-company. The balance of the income of these subsidiaries was transferred to the parent-company, which reported it as income for the purpose of income taxes and declared excess profits taxes for 1938. The Commissioner of Internal Revenue assessed each of the subsidiaries for deficiencies in income tax and declared value excess profits tax for that year. The Tax Court ruled in favor of the subsidiaries. The Court of Appeals reversed. Appeal was made by the subsidiaries to the United States Supreme Court.

Mr. Vinson, C.J.: Petitioners are three wholly owned subsidiaries of Air Reduction Corporation (Airco). They seek a determination of the question whether deficiencies in income and declared value excess profits taxes for the year 1938 found by the Commissioner of Internal Revenue are properly chargeable to them. Their contention

is that they are corporate agents of Airco, that the income from their operations is income of Airco, and that income and excess profits taxes must be determined on that basis.

By a series of combinations and dissolutions of previously acquired subsidiary companies, Airco had, prior to 1938, reduced the number of its subsidiaries to four. All operated strictly in accordance with contracts with Airco. The subsidiaries were utilized by Airco as operating companies in the four major fields of operation in which it was engaged. Air Reduction Sales Company carried on the manufacture and sale of the gaseous constituents of air; National Carbide Corporation, the manufacture and sale of calcium carbide; Pure Carbonic, Inc., the manufacture and sale of carbon dioxide; and Wilson Welder and Metals Company, the manufacture and sale of welding machines and supplies.[1]

The contracts between Airco and its subsidiaries provided, in substance, that the latter were employed as agents to manage and operate plants designed for the production of the products assigned to each, and as agents to sell the outputs of the plants. Airco was to furnish working capital, executive management and office facilities for its subsidiaries. They in turn agreed to pay Airco all profits in excess of six per cent on their outstanding capital stock, which in each case was nominal in amount.[2] Title to the assets utilized by the subsidiaries was held by them, and amounts advanced by Airco for the purchase of assets and working capital were shown on the books of the subsidiaries as accounts payable to Airco. The value of the assets of each company thus approximated the amount owed to Airco. No interest ran on these accounts.

Airco and its subsidiaries were organized horizontally into six overriding divisions: corporate, operations, sales, financial, distribution, and research. Officers heading each division were, in turn, officers of the subsidiaries. Top officials of Airco held similar positions in the subsidiary companies. Directors of the subsidiaries met only to ratify the action of the directors and officers of Airco.

Airco considered the profits turned over to it by the subsidiaries pursuant to the contracts as its own income and reported it as such. Petitioners reported as income only the six per cent return on capital that each was entitled to retain. Similarly, in declaring the value of their capital stock for declared value excess profits tax purposes, the subsidiaries reported only the nominal amounts at which the stock was carried on the books of each. The Commissioner notified petitioners of substantial income and excess profits tax deficiencies in their 1938 returns, having taken the position that they are taxable on the income turned over to Airco as well as the nominal amounts retained. The Tax Court held, however, that the income from petitioners' operations in excess of six per cent of their capital stock was income and property of Airco.

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[1] Wilson Welder had a net deficit during the year here involved and is not a petitioner in this action.

[2] Sales had outstanding 125 shares of stock of $100 par value; Carbide's outstanding capital stock was 50 shares of $100 par value; Carbonic also had 50 shares of $100 par value.

According to the Tax Court's opinion: "The issue which (was decided) in this proceeding is whether, as the respondent has determined, the income from the operations of the three petitioners belonged not to Airco, the parent, but to the petitioners, and was taxable to them; or whether, as the three petitioners contend, the income from the operations of the petitioners in 1938, exclusive of the small amounts paid to petitioners under the contracts, belonged and was taxable to Airco, the parent company, both because the petitioners were in fact incorporated departments, divisions, or branches of Airco's business and because the petitioners operated pursuant to express contract with Airco."

So far as control is concerned, we can see no difference in principle between Airco's control of petitioners and that exercised over *Moline Properties, Inc.*, by its sole stockholder. Undoubtedly the great majority of corporations owned by sole stockholders are "dummies" in the sense that their policies and day-by-day activities are determined not as decisions of the corporation but by their owners acting individually. We can see no significance, therefore, in findings of fact such as, "The Airco board held regular meetings and exercised complete domination and control over the business of Airco and each of the petitioners," and "The chairman, vice chairman, and president of Airco were in charge of the administration and management of the activities of each petitioner and carried out the policies and directives with respect to each petitioner as promulgated by the Airco board." We reversed the Board of Tax Appeals in *Moline Properties* in the face of its finding that "Full beneficial ownership was in Thompson (the sole stockholder), who continued to manage and regard the property as his own individually."

Some stress was placed by the Tax Court, and by petitioners in argument here, upon the form of ownership of assets adopted by

Airco and its subsidiaries. Petitioners' capital stock was, as has been stated, nominal in amount. Assets of considerable value, to which title was held by the subsidiaries, were balanced by accounts payable to Airco on the books of each. The Tax Court thought it material that "All assets held by each petitioner were furnished to it by Airco, which paid for them with its own cash or stock. Airco supplied all the working capital of each petitioner."

If Airco had supplied assets to its subsidiaries in return for stock valued at amounts equal to the value of the assets, no question could be raised as to the reality of ownership of the assets by the subsidiaries. Airco would then have been in a position comparable, so far as ownership of the assets of petitioners is concerned, to that of the sole stockholder in *Moline Properties*. We think that it can make no difference that financing of the subsidiaries was carried out by means of book indebtedness in lieu of increased book value of the subsidiaries' stock. A corporation must derive its funds from three sources: capital contributions, loans, and profits from operations. The fact that Airco, the sole Stockholder, preferred to supply funds to its subsidiaries primarily by the second method, rather than either of the other two, does not make the income earned by their utilization income to Airco. We need not decide whether the funds supplied to petitioners by Airco were capital contributions rather than loans. It is sufficient to say that the very factors which, as petitioners contend, show that Airco "supplied" and "furnished" their assets also indicate that petitioners were the recipients of capital contributions rather than loans.[4]

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[3] As a practical matter, a considerable part of the assets of petitioners was supplied out of profits from their operations. Even though assets were purchased directly out of the earnings of a subsidiary, however, the amount withdrawn was entered in the accounts payable by the subsidiary and in the accounts receivable of Airco, since substantially all profits of the subsidiaries were, by contract, payable only to the parent.

[4] Since petitioners were required to pay all profits except very small amounts to Airco each year, it was obviously impossible for them to pay the accounts payable to Airco. . . . Mr. C. E. Adams, Chairman of Air Reduction Corporation, testified that the assets of the subsidiaries represented by the accounts payable could be realized by Airco only upon dissolution of the subsidiaries. In other words, there was never any expectation that the accounts would be paid prior to dissolution. Since no interest ran on these accounts, the "loans" were identical, except in name, with contributions of capital. . . . The fact that no interest ran on these "loans" is, of course, further indication that they are capital contributions.

Title to gas cylinders used by petitioners, amounting in value to about $13,000,000, was retained by Airco, but the cylinders were used by the subsidiaries without charge. Whether these, too, were capital contributions we find it unnecessary to decide in this case. Free use of the cylinders by petitioners, if they were merely on loan, may have distorted the subsidiaries' income beyond the allocations made by the Commissioner, but that problem is not before us.

Nor do the contracts between Airco and petitioners by which the latter agreed to pay all profits above a nominal return to the former, on that account, become "agency" contracts within the meaning of our decisions. The Tax Court felt that the fact that Airco was entitled to the profits by contract shows that the income "belonged to Airco" and should not, for that reason, be taxed to petitioners. Our decisions requiring that income be taxed to those who earn it, despite anticipatory agreements designed to prevent vesting of the income in the earners, foreclose this result. . . . Of course one of the duties of a collection agent is to transmit the money he receives to his principal according to their agreement. But the fact that petitioners were required by contract to turn over the money received by them to Airco, after deducting expenses and nominal profits, is no sure indication that they were mere collection agents. Such an agreement is entirely consistent with the corporation-sole stockholder relationship whether or not any agency exists, and with other relationships as well.

What we have said does not foreclose a true corporate agent or trustee from handling the property and income of its owner-principal without being taxable therefor. Whether the corporation operates in the name and for the account of the principal, binds the principal by its actions, transmits money received to the principal, and whether receipt of income is attributable to the services of employees of the principal and to assets belonging to the principal are some of the relevant considerations in determining whether a true agency exists. If the corporation is a true agent, its relations with its principal must not be dependent upon the fact that it is owned by the principal, if such is the case. Its business purpose must be the carrying on of the normal duties of an agent.

They claim that they should be taxable on net income aggregating only $1,350.00, despite the fact that during the tax year (1938) they owned assets worth nearly 20 million dollars, had net sales of approximately 22 million dollars, and earned nearly four and one-half million dollars net. Their employees number in the thousands. We have passed the questions whether Airco's interest in these assets is that of owner of the subsidiaries or lender, but whatever the answer, they do not belong to Airco as principal. The entire earnings of petitioners, except for trifling amounts, are turned over to Airco not because the latter could command this income if petitioners were owned by third persons but because it owns and thus completely dominates the subsidiaries. Airco, for sufficient reasons of its own, wished to avoid the burdens of principalship.[5] It cannot now escape the tax consequences of that choice, no matter how bona fide its motives or long standing its arrangements. When we referred to the "usual incidents of an agency relationship" in the *Moline Properties* case, we meant just that—not the identity of ownership and control disclosed by the facts of this case.

We have considered the other arguments made by petitioners and find them to be without merit. The judgment of the Court of Appeals is *Affirmed*.

QUESTIONS

1. Can you suggest any way in which Airco could retain its present corporate organization but have the income show as that of the parent-company?
2. Would the income tax rate and the excess profits tax ever influence the distribution of profits among a parent-company and its subsidiaries?
3. What comment would you make as to the capital structure of the subsidiaries in this case for the purpose of the declared value excess profits tax? Would this arrangement affect the total tax liability for the consolidated companies?
4. From the facts of the case does it appear that Airco sacrificed profits, as regards the tax liability of showing all profits in the parent-company, for the purpose of attempting to establish an agency relationship. Does this mean the company failed to maximize profits under existing legal framework?

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[5] The two main purposes for the adoption by Airco of the corporate subsidiary method of operation, as related by Mr. F. E. Adams, Chairman of Air Reduction Corporation, were these "Frankly, in 1918 and still, Air Reduction, Inc., was and is a New York corporation. Even at that early date it became evident, as I already said, we were going to have plants scattered all over the United States We didn't want to domicile the parent company in 48 states of the Union and have us subject to service in all those states, and that was distinctly a reason for using this corporate setup in connection with operations to be run as divisions, just as the contract set forth.

"Now, in addition to that, as a practical matter, out in the field and on the firing line, to have a representative, an officer, we will say, of Pure Carbonic, when trouble arises with a customer, a vice president of Pure Carbonic, who is not an officer of Air Reduction, Inc., at all, who goes in and straightens that out with that customer, increases his cudos, helps him with all his negotiating efforts, with their competitors on the outside."

It is thus apparent that Airco was attempting to avoid the status of principal *vis-a-vis* its subsidiaries. As principal it would have been subject to service of process through its agents, as owner of the subsidiary it was not. . . . The purpose of having officers of subsidiaries who could deal directly with customers does not indicate an agency relationship. On the contrary, the very purpose of the organization adopted was to lead customers to believe that they were dealing with top men in the company actually manufacturing and selling the products they purchased.

5. How would a change in the tax brackets for a graduated corporate income tax affect the relationships between a parent-company and its subsidiaries?

Case VIII-2: STANDARD OIL COMPANY OF CALIFORNIA et al. v. *UNITED STATES*, 337 U.S. 293

Under contracts entered into by an oil company with independent dealers in petroleum products and automobile accessories, the dealer agreed to purchase exclusively from the company all of his requirements of one or more of the products marketed by the company. In 1947 the contracts affected a gross business of $58,000,000, comprising 6.7 per cent of the total in a seven-state area in which the company sold its products. Held: The contracts were violative of Section 3 of the Clayton Act, and the company was properly enjoined from enforcing or entering into them.

MR. JUSTICE FRANKFURTER: This is an appeal to review a decree enjoining the Standard Oil Company of California and its wholly-owned subsidiary, Standard Stations, Inc.,[1] from enforcing or entering into exclusive supply contracts with any independent dealer in petroleum products and automobile accessories.

The Standard Oil Company of California, a Delaware corporation, owns petroleum-producing resources and refining plants in California and sells petroleum products in what has been termed in these proceedings the "Western area"—Arizona, California, Idaho, Nevada, Oregon, Utah and Washington. It sells through its own service stations, and to industrial users. It is the largest seller of gasoline in the area. In 1946 its combined sales amounted to 23 per cent of the total taxable gallonage sold there in that year: sales by company-owned service stations constituted 6.8 per cent of the total, sales under exclusive dealing contracts with independent service stations, 6.7 per cent of the total; the remainder were sales to industrial users. Retail service-station sales by Standard's six leading competitors absorbed 42.5 per cent of the total taxable gallonage; the remaining retail sales were divided between more than seventy small companies. It is undisputed that Standard's major competitors employ similar exclusive dealing arrangements. In 1948 only 1.6 per cent of retail outlets were known as "split-pump" stations, that is, sold the gasoline of more than one supplier.

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[1] Standard Stations, Inc., has no independent status in these proceedings; since 1944 its activities have been confined to managing service stations owned by the Standard Oil Company of California.

Exclusive supply contracts with Standard had been entered into, as of March 12, 1947, by the operators of 5,937 independent stations, or 16 per cent of the retail gasoline outlets in the Western area, which purchased from Standard in 1947, $57,646,233 worth of gasoline and $8,200,089.21 worth of other products. Some outlets are covered by more than one contract so that in all about 8,000 exclusive supply contracts are here in issue. These are of several types but a feature common to each is the dealer's undertaking to purchase from Standard all his requirements of one or more products. Two types, covering 2,777 outlets, bind the dealer to purchase of Standard all of his requirements of gasoline and other petroleum products as well as tires, tubes, and batteries. The remaining written agreements, 4,368 in number, bind the dealer to purchase of Standard all his requirements of petroleum products only. It was also found that independent dealers had entered 742 oral contracts by which they agreed to sell only Standard's gasoline. In some instances dealers who contracted to purchase from Standard all their requirements of tires, tubes, and batteries, had also orally agreed to purchase of Standard their requirements of other automobile accessories. Of the written agreements, 2,712 were for varying specified terms; the rest were effective from year to year but terminable "at the end of any such year, by giving to the other at least 30 days prior thereto written notice. . . ." Before 1934 Standard's sales of petroleum products through independent service stations were made pursuant to agency agreements, but in that year Standard adopted the first of its several requirements-purchase contract forms, and by 1938 requirements contracts had wholly superseded the agency method of distribution.

Between 1936 and 1946 Standard's sales of gasoline through independent dealers remained at a practically constant proportion of the area's total sales; its sales of lubricating oil declined slightly during that period from 6.2 per cent to 5 per cent of the total. Its proportionate sales of tires and batteries for 1946 were slightly higher than they were in 1936, though somewhat lower than for some intervening years; they have never, as to either of these products, exceeded 2 per cent of the total sales in the Western area.

Since Section 3 of the Clayton Act was directed to prohibiting specific practices even though not covered by the broad terms of the Sherman Act, it is appropriate to consider first whether the enjoined contracts fall within the prohibition of the narrower Act. The relevant provisions of Section 3 are:

> "It shall be unlawful for any person engaged in commerce, in the course of such commerce, to lease or make a sale or contract for sale of goods, wares, merchandise, machinery, supplies, or other commodities, whether patented or unpatented, for use, consumption, or resale within the United States . . . on the condition, agreement, or understanding that the lessee or purchaser thereof shall not use or deal in the goods . . . of a competitor or competitors of the . . . seller, where the effect of such lease, sale, or contract for sale or such condition, agreement, or understanding may be to substantially lessen competition or tend to create a monopoly in any line of commerce."

Obviously the contracts here at issue would be proscribed if Section 3 stopped short of the qualifying clause beginning, "where the effect of such lease, sale, or contract for sale. . . ." If effect is to be given that clause, however, it is by no means obvious, in view of Standard's minority share of the "line of commerce" involved, of the fact that share has not recently increased, and of the claims of these contracts to economic utility, that the effect of the contracts may be to lessen competition or tend to create a monopoly. It is the qualifying clause, therefore, which must be construed.

The District Court . . . concluded: "Grant that, on a comparative basis, and in relation to the entire trade in these products in the area, the restraint is not integral. Admit also that control of distribution results in lessening of costs and that its abandonment might increase costs. . . . Concede further, that the arrangement was entered into in good faith, with the honest belief that control of distribution and consequent concentration of representation were economically beneficial to the industry and to the public, that they have continued for over fifteen years openly, notoriously and unmolested by the Government, and have been practiced by other major oil companies competing with Standard, that the number of Standard outlets so controlled may have decreased, and the quantity of products supplied to them may have declined, on a comparative basis. Nevertheless, as I read the latest cases of the Supreme Court, I am compelled to find the practices here involved to be violative of both statutes. For they affect injuriously a sizeable part of interstate commerce, or,—to use the current phrase,—'an appreciable segment' of interstate commerce."

The issue before us, therefore, is whether the requirement of showing that the effect of the agreements "may be to substantially lessen competition" may be met simply by proof that a substantial portion of commerce is affected or whether it must also be demonstrated that competitive activity has actually diminished or probably will diminish.

We are dealing here with a particular form of agreement specified by Section 3 and not with different arrangements, by way of integration or otherwise, that may tend to lessen competition. To interpret that section as requiring proof that competition has actually diminished would make its very explicitness a means of conferring immunity upon the practices which it singles out. Congress has authoritatively determined that those practices are detrimental where their effect may be to lessen competition. It has not left at large for determination in each case the ultimate demands of the "public interest.". . . Though it may be that such an alternative to the present system as buying out independent dealers and making them dependent employees of Standard Stations, Inc., would be a greater detriment to the public interest than perpetuation of the system, this is an issue, like the choice between greater efficiency and freer competition, that has not been submitted to our decision. We are faced, not with a broadly phrased expression of general policy, but merely a broadly phrased qualification of an otherwise narrowly directed statutory provision.

In this connection it is significant that the qualifying language was added only after a flat prohibition of tying clauses and requirements contracts had passed both Houses of Congress. The conferees responsible for adding that language were at pains, in answering protestations that the qualifying clause seriously weakened the section, to disclaim any intention seriously to augment the burden of proof to be sustained in establishing violation of it. It seems hardly likely that, having with one hand set up an express prohibition against a practice thought to be beyond the reach of the Sherman Act, Congress meant, with the other hand, to reestablish the necessity of meeting the same tests of detriment to the public interest as that Act had been interpreted as requiring. Yet the economic investigation which appellant would have us require is of the same broad scope as was adumbrated with reference to unreasonable restraints of trade in Chicago Board of Trade v. United States, 246 U.S. 231. To insist upon such an investigation would be to stultify the force of

Congress' declaration that requirements contracts are to be prohibited wherever their effect "may be" to substantially lessen competition. If in fact it is economically desirable for service stations to confine themselves to the sale of the petroleum products of a single supplier, they will continue to do so though not bound by contract, and if in fact it is important to retail dealers to assure the supply of their requirements by obtaining the commitment of a single supplier to fulfill them, competition for their patronage should enable them to insist upon such an arrangement without binding them to refrain from looking elsewhere.

We conclude, therefore, that the qualifying clause of Section 3 is satisfied by proof that competition has been foreclosed in a substantial share of the line of commerce affected. It cannot be gainsaid that observance by a dealer of his requirements contract with Standard does effectively foreclose whatever opportunity there might be for competing suppliers to attract his patronage, and it is clear that the affected proportion of retail sales of petroleum products is substantial. In view of the widespread adoption of such contracts by Standard's competitors and the availability of alternative ways of obtaining an assured market, evidence that competitive activity has not actually declined is inconclusive. Standard's use of the contracts creates just such a potential clog on competition as it was the purpose of Section 3 to remove wherever, were it to become actual, it would impede a substantial amount of competitive activity. . . .

The judgment below is *Affirmed.*

QUESTIONS

1. What alternative method of distribution of Standard's products would you recommend in view of this decision?
2. Is there any difference in the nature of the costs involved in an agency method of distribution as compared with the independent dealer?
3. Is there any difference in the nature of the costs involved in the requirements contracts for independent dealers as compared to that of company-owned stations?
4. Is there any possible relationship between the use of requirements contracts and total unit cost of production? Could the decision in this case have any possible effect upon the price of petroleum products?
5. Assuming that the Standard Oil Company of California was maximizing profits under the requirements contract arrangement, will an alternative method of distribution probably cost more or less than the present arrangement? In both the long and the short run?

6. If a decision is made to market through company-owned service stations, what kind of corporate organization would you recommend? Why?

Case VIII–3: STANDARD OIL COMPANY v. FEDERAL TRADE COMMISSION, 173 F. 2d 210

MINTON, CIRCUIT JUDGE: The petitioner seeks to review a cease and desist order issued by the respondent ordering it to cease and desist from discriminating in the price of gasoline of the same grade and quality among its customers in violation of Section 2(a) of the Clayton Act, as amended by the Robinson-Patman Price Discrimination Act, 15 U.S.C.A. Section 13. The Commission asks the enforcement of its order.

The petitioner contends that the order should not be enforced because . . . the Commission treated as immaterial the petitioner's conclusive showing that the discrimination made in price was in good faith to meet an equally low price of a competitor, which showing the petitioner asserts is a complete defense . . . the petitioner contends that:

"Paragraph 6 of the Modified Order directs Standard at its peril to prevent jobbers to whom it sells gasoline and who are in competition with Standard in the resale thereof from reselling to their retail dealers at prices less than Standard's price to its own retail dealers; requires Standard to police, maintain and regulate such competitor's prices on gasoline, title to which passed to the jobbers on delivery by Standard; and subjects Standard retroactively to punishment for contempt should a jobber-competitor fail to maintain such resale prices."

Substantial evidence in this record shows the following facts as found by the Commission. The petitioner's principal office and place of business is located in Chicago, Illinois. It is engaged in the business of refining and distributing gasoline and other petroleum products throughout fourteen states, principally in the Middle West. The petitioner has a refinery at Whiting, Indiana, to which it supplies crude oil from fields located in other states. One of the divisions in which it distributes its products is known as the Detroit Field, which embraces some thirteen counties in southern Michigan, including the city of Detroit. The Detroit Area, as distinguished from the Detroit Field, is confined to the city of Detroit and its suburbs. The petitioner has no refinery in Michigan, and almost all the gasoline it sells and distributes in the Detroit Field is transported by tankers from its refinery at Whiting through the Great Lakes to the petitioner's marine terminal at River Rouge, outside the city of Detroit. This terminal has a storage tank capacity of sixty-three million gallons. During the summer months, deliveries are made from Whiting weekly and sometimes twice weekly. In the fall, sufficient gasoline is delivered and stored to take care of the estimated requirements during the winter months when navigation on the Great Lakes is closed. The amount of gasoline used in Detroit is fairly constant and can be accurately estimated. During the years from 1936 through 1940, the years here in question, the petitioner supplied 16 to 17 per cent of all the gasoline in the Detroit Area. In addition to the River Rouge tanks, the petitioner operated six bulk plants in the Detroit Area. Practically all of the gasoline sold in the Detroit Area passed through the River Rouge terminal, except that in some instances gas was delivered directly from Whiting by truck and also by the same means to commercial users. Deliveries were made from the River Rouge terminal by tank cars and tank trucks up to February 1, 1940, and thereafter by trucks alone. The delivery trucks were owned and operated or leased and operated by the petitioner through its employees.

The petitioner supplied gasoline to approximately 358 retail service stations, approximately two hundred of which the petitioner owned and leased, and eight of which it leased and subleased. The remaining 150 were independent operators who owner or leased their stations from someone else. The latter had agreements to purchase their entire requirements of Standard Oil gasoline only from the petitioner. While the former had no such agreements, they did not buy gasoline from anyone except the petitioner. The delivery to the retail customers was known as "tank wagon delivery" and was made at a price fixed in Chicago by the petitioner from time to time, known in the trade as the "posted tank-wagon price."

In addition, the petitioner supplied gasoline to four dealers in the Detroit Area, Citrin-Kolb Oil Company, Stikeman Oil Company, Inc., Wayne Oil Company, and Ned's Auto Supply Company, hereinafter sometimes referred to as Citrin, Stikeman, Wayne, and Ned's. These customers were also known as wholesale customers. They had their own storage tanks and trucks for delivery and met the credit qualifications of the petitioner.

During the time in question Citrin, Stikeman, and Wayne sold a substantial portion of their gasoline purchased from the petitioner direct to the public through retail service stations owned and operated by them. Ned's was engaged entirely in the retail sale of gasoline to the public through its own stations. To these last four customers, known, as we have pointed out, as the wholesale customers, the petitioner has discriminated in price by selling its gasoline to them for resale at wholesale and through their own retail stations at a price substantially lower than the prices charged retail purchasers in the Detroit Area for gasoline of the same grade and quality. The petitioner's Red Crown gasoline, its largest selling brand and comprising about 90 per cent of its sales in the Detroit Area, was sold to those four wholesalers at 1½ cents a gallon lower than the prices charged by the petitioner for the same gasoline to other retail dealers in the Detroit Area.

Citrin, in addition to supplying its own stations which sold at retail, from January 1, 1938, to December 31, 1940, sold one million gallons of gasoline annually to Langer and Cohn, who run a chain of service stations, at 1 cent a gallon less that the tank wagon price, and in addition sold another retail service operator at ½ cent a gallon less than the tank wagon price. For a time Citrin also issued special service cards which entitled the holder to a 2 cent a gallon discount on the purchase of gasoline from one of the retail service stations operated by Citrin.

There is no evidence that Wayne ever sold gasoline to retailers at a price lower than the posted tank-wagon price charged by the petitioner to its dealers or that Wayne ever allowed any discounts. The same is true of Stikeman.

Ned's, however, sold at retail exclusively, and it has been its practice since March 7, 1938, to sell to its customers below the prevailing retail service station price or to give premiums and discounts which result in a price below its posted price.

A lower price at one service station than at another is an important factor in the purchasing public's mind, especially in the price of petitioner's advertised brands. Any difference in price between two stations selling the same brand of gasoline is very important in influencing the business. The margin of profit between the tank wagon price to a service station and the retail price is small, averaging since November 1, 1939, about 3.3 cents a gallon in the Detroit Area.

In 1937 Ned's was selling the petitioner's Red Crown gasoline to the public at approximately 2 cents a gallon below the prevailing retail service station price, which continued with variations until the latter part of 1939. In 1939 and 1940, when Ned's posted price was the prevailing retail price, it gave premiums and discounts under cover. It has from time to time given commercial discounts of 1 to 2 cents a gallon off the posted tank-wagon price. In 1939, Ned's also issued trading stamps with a value of 2 cents a gallon, which were redeemable in merchandise or gasoline at Ned's stores. Price cutting at Ned's stores has been almost continuous, and this company has been responsible for starting most of the retail price cutting in major brand gasolines in Detroit over a period of several years. This practice of Ned's has caused substantial damage to other retail service station operators selling the petitioner's Red Crown gasoline and also to retail service station operators selling other brands of gasoline.

The price discriminations granted to Ned's, Citrin, Wayne, and Stikeman on gasoline sold by them at retail have given a substantial competitive advantage to these favored dealers in their retail operations over other retailers of gasoline, including retail customers of the petitioner. This competitive advantage is capable of being used and has been used by Ned's and to some extent by Citrin to divert large amounts of business from other gasoline retailers, including customers of the petitioner, with resultant injury to them and to their ability to continue in business and successfully compete with Ned's and Citrin in the retailing of gasoline. The effect of these discriminations in price allowed by the petitioner to Ned's, Citrin, Wayne, and Stikeman has been and may be substantially to lessen competition and to injure, destroy, and prevent competition with each of these four dealers and with their respective customers in the retail sale of gasoline.

There is substantial evidence in this record, and we think it may be assumed to be conclusive, to the effect that the petitioner made its low price to Ned's, Citrin, Wayne, and Stikeman in good faith to meet the lower price of a competitor. The petitioner failed to show that the discriminatory price which it made these four dealers was justified on the basis of any cost savings.

The showing made here by the petitioner that it made the lower price in good faith to meet competition, we assume as the Commission apparently did, was made out. The effect of it was to rebut the prima facie case made by the Commission's proof of the petitioner's discriminatory prices. If nothing further appeared in this record, the case might well have ended there. The reason for making the discrimination was effective to rebut the prima facie case in price discrimination, but it still remained a discrimination, and that discrimination affected competition on the retail level among the retail customers of the wholesalers to whom the petitioner has sold. The discrimination in price in favor of the parties in this case, which the petitioner had a right to make as against its competitors, was then used by the petitioner's customers to work havoc among competitors on the retail level. The petitioner had given a club to its wholesalers which they passed on to their retailers to bludgeon their competitors. This is what the Commission is trying to stop, and it is towards the elimination of this evil that the cease and desist order is directed.

The Commission here considered the other evidence as to the effect on competition of this continuing discrimination and found, and it was justified in finding, that the discrimination not only may but did affect competition. There is substantial evidence in this record that the petitioner's favored wholesalers were in a position to do and did do injury to competition. Where as here the discrimination is between purchasers who are in competition, and the competition which is alleged and proved to be injured is among the retail customers of the favored purchasers and other retailers, the fact that the seller's discriminatory price was made to meet his own competition is not controlling. The discrimination continued here and its effect was direct and harmful to competition and was properly condemned by the Commission's order, notwithstanding the petitioner's discrimination in price was made in good faith to meet competition of its own.

We agree with the Commission that the showing of the petitioner that it made the discriminatory price in good faith to meet competition is not controlling in view of the very substantial evidence that its discrimination was used to affect and lessen competition at the retail level.

The petitioner objects to Paragraph 6 of the cease and desist order. This paragraph reads as follows:

"6. By selling such gasoline to any jobber or wholesaler at a price lower than the price which respondent charges its retailer-customers who in fact compete in the sale and distribution of such gasoline with the retailer-customers of such jobbers or wholesalers, where such jobber or wholesaler resells such gasoline to any of its said retailer-customers at less than respondent's posted tank-wagon price or directly or indirectly grants to any such retailer-customer any discounts, rebates, allowances, services or facilities having the net effect of a reduction in price to the retailer."

This paragraph is intended to eliminate the effects of the discriminatory price made to these customers, Citrin, Wayne, and Stikeman, who do a wholesale business. To avoid the force of this paragraph, the petitioner may do one of two things. First, discontinue selling to wholesalers at a price different than that made to retailers. The petitioner's three largest competitors in Detroit have found it agreeable to do so. The petitioner argues that this is an elimination of wholesalers. If this be true, it is elimination only where their existence cannot be justified except on the exploitation of a differential in price not justified by any cost savings to obtain that price. This does not impress us as either illegal, unwarranted, or unjust.

Secondly, the petitioner may under the right to choose its customers refuse to sell to wholesalers who sell to retailers below the price the petitioner makes to its own retailers. The petitioner does not have to make price control agreements with anyone. It has only to govern its own conduct to avoid the impact of an unlawful discrimination. To govern its conduct, the order makes the petitioner deal with its wholesalers at its peril as to what they might do with the gasoline in the future. The petitioner has no control and can have no control over the price of the gasoline after it is sold to the wholesalers. The latter may put any price on it they may choose. They may give it away if they like. The petitioner should not be required to police its wholesalers and to sell to them at the petitioner's peril. The petitioner should be liable if its sells to a wholesaler it knows or ought to have known is engaging in or intends to engage in the competitive practices condemned by this proceeding. Under the order as drawn, the petitioner would be liable if afterwards the wholesaler should resell at a price lower than the petitioner charged its retailers. If the petitioner is to be hailed into court for a violation of the Commission's order, the petitioner must be guilty of knowingly choosing a customer who is using or intends to use its price advantage to undersell the petitioner in its prices made to its retailers.

We would modify Paragraph 6 to read as follows:

"By selling such gasoline to any jobber or wholesaler at a price lower than the price which respondent charges its retailer-customers who in fact compete in the sale and distribution of such gasoline with the retailer-customers of such jobbers or wholesalers, where such jobber or wholesaler, to the knowledge of the respondent or under such circumstances as are reasonably calculated to impute knowledge to the respondent, resells such gasoline or intends to resell the same to any of its said retailer-customers at less than respondent's posted tank-wagon price or directly or indirectly grants to any such retailer-customer any discounts, rebates, allowances, services or facilities having the net effect of a reduction in price to the retailer."

The order as modified will be enforced, and judgment thereon will be entered accordingly.

QUESTIONS

1. Would you recommend that Standard Oil Company follow one of the alternatives suggested by the court? Which? Why?
2. If the first alternative is followed and the result is a substantial decline in the company's volume of business in the Detroit area, would you recommend a reduction in the posted tank-wagon price, and thus the retail price, in an effort to recover the lost portion of the market? Why?
3. If the second alternative is followed, what probable effects will this have upon the sales of the company?
4. Would you recommend that Standard Oil Company acquire the retail service stations of Ned's and Citrin's as a method of eliminating this problem of price discrimination? What would this involve in the nature of costs?
5. Can you suggest any methods, other than the alternative mentioned, to overcome this problem, in view of the decision rendered?

Case VIII–4: McLOCHLIN HARDWARE COMPANY

In 1850, the partnership of McLochlin and McLochlin was formed to engage in the retail hardware business. In 1891 the company was reorganized into a corporation known as the McLochlin Hardware Company, Inc., with a capital stock of $50,000. In 1947 there were 21,000 shares of stock outstanding, valued at $210,000. The ownership of these shares was divided equally among Philip McLochlin, Michael McLochlin, and Mrs. James Wheeler, the great-grandsons and great-granddaughter, respectively, of one of the founders. At the time of incorporation the company erected a building on the main street of a growing city in northern Illinois, about one hundred miles from Chicago. About the beginning of the present century the company expanded into wholesale operations. This move was occasioned chiefly by the increased demand for builders' and heavy hardware as the community grew in population and as a small industrial center. The early wholesale customers of the company were primarily building contractors, but, by 1947, the company had two salesmen covering about eighteen counties in northern Illinois, with the exception of the city of Chicago. The company's largest competitor for many years had been the firm of Hibbard, Spencer, and Bartlett, of Chicago. Outside the city of Chicago the McLochlin Hardware Company competed directly with Hibbard, Spencer, and Bartlett. The wholesale price policy of the McLochlin Hardware Company was to follow the prices listed by this largest of competitors. To some extent the prices were set for both by the manufacturers under the resale price-maintenance laws. The wholesale operations of the McLochlin Hardware Company in 1946 were distributed among buyers as follows: 55 per cent to industrial users, 38 per cent to retail hardware outlets, and 7 per cent to miscellaneous types of buyers.

By 1928 the volume of wholesale business exceeded retail sales, as is shown in Exhibit 1. Both wholesale and retail operations were carried on in the building owned by the corporation. This building was a four-story structure of brick, located, as stated above, on the main street of the city in the heart of the retail area. On the first floor was the sales room, where both wholesale and retail transactions were carried out. The rear of the first floor was used for a shipping room. The second floor was used as additional display space, offices, and some storage. The third and fourth floors were used for storage exclusively. The company carried a fairly complete line of automotive supplies, builder's hardware, electrical supplies, industrial supplies, household equipment, paints and supplies, plumbing and heating supplies, and tools of various kinds. The location of the

Exhibit 1

SALES, BY DIVISIONS, OF THE McLOCHLIN HARDWARE COMPANY
FOR SELECTED YEARS

Year	Retail	Wholesale	Year	Retail	Wholesale
1923	$ 549,911.00	$ 527,040.00	1938	$ 241,392.00	$ 801,151.00
1928	502,482.00	832,221.00	1943	332,280.00	968,712.00
1933	170,750.00	447,467.00	1946	874,669.00	2,819,146.00
1937	291,389.00	946,544.00			

building was about three-fourths of a mile from the nearest railroad siding, and the truck loading platform in the rear could accommodate only trucks of small capacity. The cost of handling goods, including costs of shipments to retailers and industrial users, had risen rather sharply since 1940.

In 1947 the Federal Trade Commission issued a complaint against the company, accusing it of violation of Section 2 (a) of the Clayton Act as amended by the Robinson-Patman Price Discrimination Act. It was pointed out that under the Robinson-Patman Act a single corporation could not carry on both wholesale and retail operations. It was charged that the company sold merchandise of the same quantity and quality to different buyers at different prices, some being charged the wholesale price and others the retail price, depending upon the classification placed upon the purchaser by the company at the time of sale. From time to time the company had received complaints from customers about price differentials, but no effort had been made to answer them. Upon recommendation of its attorney, the company did not contest the charge and entered into a stipulation to discontinue the price discrimination as charged.

Exhibit 2

NET EARNINGS, AFTER TAXES, OF THE McLOCHLIN HARDWARE COMPANY FOR SELECTED YEARS

Year	Earnings	Year	Earnings
1923*	$ 64,073.00	1937‡	$ 27,684.00
1928*	47,961.00	1938§	17,188.00†
1931*	22,908.00†	1942§	86,102.00
1932*	43,460.00†	1946	136,580.00
1933*	6,753.00†		

* Combined wholesale and retail operations
‡ First nine months combined operations. Last three months, wholesale only
§ Wholesale operations only. Retail earnings not available
† Deficit

As a result of this decision, the company faced several possible alternatives. First, the company could abandon either the wholesale or the retail operations and concentrate upon one of them. Second, it could separate the two divisions into separate corporations and use separate physical locations. Third, it could separate the two divisions into separate corporations and remain in the present facilities.

There was disagreement among the owners, who were also the directors of the corporation, as to which course should be followed. Mr. Philip McLochlin favored the abandonment of the retail division

Exhibit 3

McLOCHLIN HARDWARE COMPANY, INC., BALANCE SHEET, DECEMBER 31, 1946

Assets:			
Current Assets			
Cash		$ 9,869.49	$
United States securities		15,125.00	
Other securities (market value)		204.00	
Cash surrender life insurance policy		5,012.20	
Accounts receivable	$275,861.61		
Less reserve	26,420.59	249,441.02	
Employees accounts receivable		10,691.34	
Due from vendors		5,753.63	
Merchandise inventory		577,573.36	
Total Current Assets			$ 873,670.04
Fixed Assets (net book value)			173,583.26
Other Assets and Deferred Charges			7,124.40
Total Assets			$1,054,377.70
Liabilities			
Current liabilities			
Accounts payable		$161,572.18	
Accrued taxes, interest, insurance		102,091.12	
Accrued dividends payable		31,500.00	
Customers' credit balances		14,390.05	
Notes payable (trade)		7,850.00	
Total Current Liabilities			$ 327,403.35
Fixed liabilities			
First mortgage on building (due October 1, 1951)		24,000.00	
Five-year note (due December 31, 1950)		53,500.00	
Three-year note (due January 1, 1950)		25,000.00	
Total Fixed Liabilities			$ 102,500.00
Capital account			
Common stock		210,000.00	
Preferred stock		25,000.00	
Surplus		307,474.35	$ 624,474.35
Total Liabilities and Net Worth			$1,054,377.70

and the concentration on wholesale operations in the present location. He objected to the proposal of Mr. Michael McLochlin that they purchase or erect a building and move the wholesale operations to a new location, retaining the present location for retail operations. Mr. Philip McLochlin claimed that the corporation could not afford to purchase or erect a new building but that, if retail operations were abandoned, there would be sufficient room in the present location to carry on wholesale operations. To this Mr. Michael McLochlin objected that the present location was not suitable for wholesale operations because it was located in the retail district, an area of expensive real estate and high taxes. He believed that if the wholesale division were located in a less expensive area the costs of operation would be reduced. Mrs. James Wheeler, sister of the McLochlin brothers, stated that she saw no reason why anything need be changed other than the incorporation of the two divisions.

The cost of erection of a building with 100,000 square feet of floor space, the area deemed necessary by Mr. Michael McLochlin, was estimated at approximately $250,000, including the land. There were available about four acres of land, one mile from the center of town, which contained one brick building and two frame structures with a combined floor space of approximately 90,000 square feet. These buildings had formerly housed a machine shop which was erected during the recent war and was now owned by the government. This location contained two railroad sidings and a large truck loading platform which would accommodate the largest trucks. This property was available for approximately $180,000. The necessary repairs and alterations would cost an additional $50,000.

Exhibit 2 (p. 570) shows net earnings of the company for selected years. Exhibit 3 (p. 571) presents the balance sheet as of December 31, 1946.

QUESTIONS

1. What action would you recommend to the company? Why?
2. If you recommend the second alternative, how would you finance the new property? Give your reasons.
3. What problems would be involved if the third possibility were adopted?
4. What are the possible effects upon the costs, profits, and revenues of the firm as a result of the decision to cease further price discrimination?
5. If the second alternative is followed, what will be the probable effect upon total unit cost of each division, i.e., wholesale and retail. Would an increase in sales for each of the divisions alleviate this situation? In view of the price policy of the firm, how would you suggest that increased sales be sought?

Case VIII–5: MID-SOUTH PRODUCTS CORPORATION

In 1901 the Mid-South Wholesale Grocery Company was formed by the merger of two small wholesale firms. The company acted as a wholesale firm only until the first World War, at which time it acquired a small fish-packing plant in New Orleans, Louisiana. Shortly after the war a small company in Texas which milled flour and processed dry cereals was purchased. In 1923 the firm was reorganized into the Mid-South Products Corporation with the main office and warehouse in Memphis, Tennessee. A subsidiary corporation, wholly owned, was organized to handle all food manufacturing and processing. In 1926 the company purchased a commission house dealing in fresh fruits and produce. Another wholly-owned subsidiary was organized to direct this division. The parent-company concentrated its efforts upon the distribution of these various products to brokers, wholesalers, retailers, and other manufacturing firms, such as bakers, confectioners, and specialty food processors.

Among the products handled by the company were pecans, which were sold both in the shell and as shelled kernels. Pecans were purchased from individual growers by the commission division, transferred for shelling and packaging to the manufacturing division, which turned them over to the parent-company for distribution. About 90 per cent of all nuts handled were shelled. Shipments were made from the home office and also direct from the processing plants, as described below. Purchasers of pecans were located in various parts of the United States. The company had no retail outlets of its own. Pecans were processed and packaged for several grocery chains under their respective labels as well as under the brand name of the Mid-South Products Corporation.

Prior to 1932 the company had purchased pecans in the shell through its commission division and resold about 60 per cent of them without further processing. Those that were processed were shipped by truck or train from the chief growing areas in southern Mississippi, northern and central Florida, Georgia, and eastern and southern Texas. Processing was done by hand except that shells were cracked by hand-operated machines. Since highest prices were obtained for whole kernels, efforts were made to crack the shells without damaging the kernel. Kernels which were broken were sold ungraded, primarily to bakers and confectioners. Hand-processing was a very high-cost operation, but, up to 1932, the price had been high enough to cover this high labor cost and show a profit.

In 1932, however, the price of shelled pecans dropped sharply in relation to costs of processing. Although labor was relatively cheap in Memphis at the time, the prevailing wage was still such that the company could barely cover variable costs in the processing of pecans. On a total cost basis the operations were carried on at a loss for the years 1931 and 1932. In an effort to cut costs, the company decided to decentralize the processing operations. It was observed that the wage level in smaller towns and villages in the South were lower than in Memphis. As a result of several investigations, the company moved its pecan processing to three different locations—one in Quitman, Georgia; another in Crockett, Texas; and the third in Picayune, Mississippi. All locations were in pecan-growing areas, and all were towns of a few thousand population. In these small towns it was possible to secure a considerable amount of part-time labor at very low wages. In Picayune, Mississippi, for example, all the employees were women who worked as domestics part of each day and could be secured for 20 cents per hour for three to four hours each afternoon to shell and clean pecans. While the rate of turnover was high, the nature of the labor was unskilled, so that this factor was not serious. About 300 part-time workers were used in this plant for six or seven months each year.

Since pecans are harvested in the autumn season within a period of about two months, they must be stored in warehouses and withdrawn as needed. Prior to decentralization of operations, this necessitated the use of expensive warehouse space in Memphis, until the nuts were processed and again stored. Since substantially less space is required to store the shelled kernels, there was considerable pressure upon the manufacturing division to process the pecan stocks as rapidly as possible. Frequently it was necessary to employ overtime to hasten the processing. In the new locations the company was able to acquire satisfactory existing structures for storing the newly harvested pecans which were less expensive than the urban location in Memphis. In addition, the net freight charges were less on shelled pecans, plus the fact that the shells were more easily disposed of in the rural locations. In the latter places the processing could be spread over a much longer period of time. Pecans were shelled and shipped in 50-pound containers to the main plant in Memphis, where they were graded and repacked for distribution.

This decentralization permitted the company to show a profit on a total cost basis. In 1933 the company processed approximately 16,000 pounds of shelled pecans at a net profit of 21 cents per pound. By 1937 the company was processing about 24,000 pounds of shelled pecans annually at a profit of 20 cents per pound. The largest item of cost in the processing was labor. A good worker could shell about 1½ pounds of whole kernels per hour and about ⅜ pound of broken kernels. In view of hand operations, the rate of broken kernels was not considered too high.

In 1938 the President of the United States signed the Fair Labor Standards Act, which required, among other things, a minimum wage of 40 cents per hour for labor engaged in or affecting interstate commerce. In addition, the act contained provisions for payment of overtime in excess of 40 hours per week. Upon recommendation of legal counsel, the company decided to comply with the provisions of the act. In the pecan-processing operations this would require a wage increase in excess of 100 per cent.

Coincident with the passage of this act there was a sharp decline in economic activity and prices. Coupled with an unusually large walnut and almond crop in California, the price of pecans declined so that the profit per pound decreased to 4 cents. The price of pecans tends to conform in movement to the prices of nuts which are fairly good substitutes, such as walnuts, almonds, cashews, Brazil nuts, etc. The Mid-South Products Corporation distributed all kinds of nuts but processed and packaged none other than pecans.

The executive committee called a meeting of the board of directors to consider the status of the pecan-processing operations. To pay the required minimum wages and overtime would involve the company in a substantial loss at the existing market prices of shelled pecans. There was divided sentiment among the directors as to what should be done. One suggestion was to abandon the pecan business entirely, since it constituted such a small part of the business, although it was growing in size. Another was to deal only in pecans in the shell. One director suggested raising the price to cover the new labor costs.

Early in 1937 the vice-president of the company had investigated the possibilities of mechanical processing of pecans. There was little standard equipment available which the company did not already possess. However, a large eastern electrical manufacturing company had drawn up, at the request of the vice-president, plans for a machine which would crack, shell, grade, and package pecans in containers of various sizes. It was designed to operate by means of a battery of electric "eyes." Since the machine was a specially designed affair and many parts would have to be made by hand, it was estimated to cost approximately $35,000. It would, however, have a capacity of 10,000 pounds of shelled pecans per week and would require two highly skilled operators in addition to several laborers to close the containers as they were filled. The cost of constructing a machine of half that capacity was estimated to be only $2,000 less. The idea was rejected at the time because of the high cost. The cost accounting department had calculated that, with the current volume of operations, the installation of such a machine in any one of the three locations would result in a cost per pound higher than that incurred by hand operations.

The Mid-South Products Corporation competed with five other similar food processing and distributing companies in the sale of shelled pecans. Two of these companies were much larger than the Mid-South Company. In addition, there were numerous smaller companies who also sold small quantities of shelled pecans. These companies "farmed out" their shelling operations to individuals who performed the work in their homes. The Mid-South Company had experimented with this method at one time but had found it unsatisfactory for large-scale operations. The vice-president of the company had discussed the labor problem occasioned by the new law with three of his larger competitors and found that they faced the same problem. The two larger competitors each sold about 40,000 pounds of shelled pecans annually, while the third sold about the same volume as the Mid-South Company.

The cost accounting division of the Mid-South Company reported in 1938 that, if a volume of 75,000 pounds of shelled pecans could be sold annually, the company could reduce labor costs to approximately 8 cents per pound for the entire pecan operations if the machine were purchased. This included amortization of the purchase price, a special building to house the equipment, and wages of the skilled operators. At the price of pecans in 1938, this would produce a profit of about 16 cents per pound on a total cost basis.

QUESTIONS

1. What action would you recommend for the company? State your reasons.
2. If the machine were purchased, what considerations would affect your choice of its location?
3. If the machine were purchased, should the book value of the three existing processing plants be added to the cost of the machine?
4. Does this case introduce any relationship between size of market and unit cost? Explain.

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